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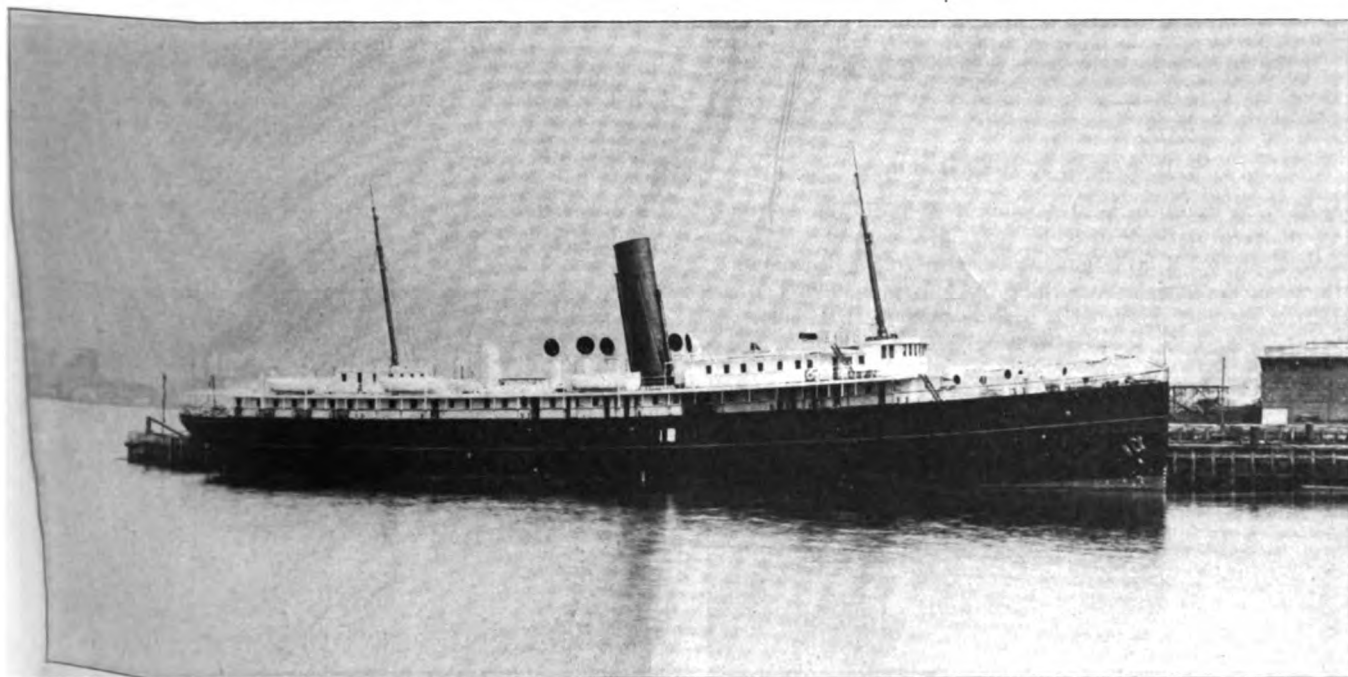
CLEVELAND, O., AUGUST 25, 1904.

No. 8.

FIRES ON SHIPBOARD.

A special committee appointed by Lloyds to inquire into the causes of fire on board ship has now made its report. The committee was appointed in the belief that there had been an apparent increase in the number of fires aboard ships. Four meetings were held by the committee and a great amount of data accumulated. Information was received from various departments of the British government, London county coun-

seventy-five cases of investigated fires on steamers the causes, as far as can be determined, were as follows: Accidents and carelessness, twenty-nine; defective arrangements as to boilers and bunkers, seventeen; defects in electrical arrangements, four; lamps and lamp explosions, ten; spontaneous, eight; cabin stoves, three; not discovered, four. In view of the number and importance of these fires, of the vast size and great value of the cargoes now carried, and of the increased



NEW STEAMSHIP ONTARIO OF THE MERCHANTS' & MINERS' TRANSPORTATION CO.'S FLEET.

[Built by the New York Ship Building Co., Camden, N. J.]

cil, Metropolitan fire brigade, dock companies, Suez Canal company and a variety of firms interested in the manufacture of chemicals for extinguishing fires. As a result of a careful analysis of ports or places at which fires have occurred the committee finds that the greater number have occurred in ports, the actual figures being 403 fires in port out of 627 cases, including all shipboard fires recorded between Jan. 1, 1902, and Sept. 30, 1903. The list comprises numerous cases in which the loss to underwriters by fire and water freely used in the efforts to extinguish it has been very disastrous. In

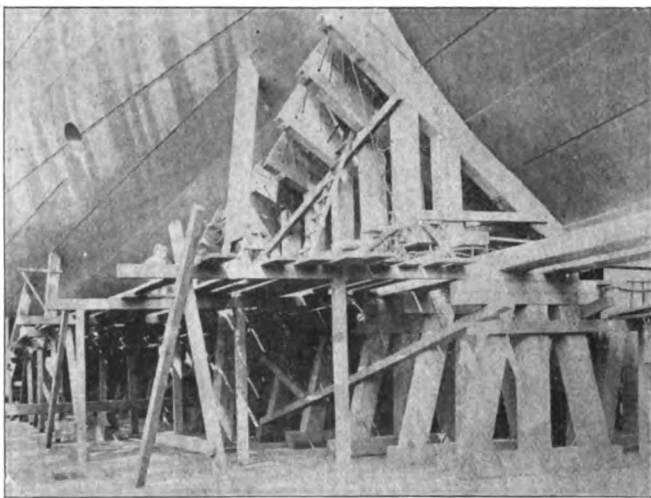
carrying capacity of merchant vessels, the committee is of opinion that the means ordinarily employed for the extinction of fires on board ship are inadequate and obsolete, and that the various port and dock authorities should be required to include in their equipment chemical apparatus of the most approved type.

Wreckers are now attempting to raise the Clyde Line steamer Kiowa which was sunk out of Boston harbor last December by the United Fruit Co.'s steamer Admiral Dewey.

LAUNCH OF THE SOUTH DAKOTA.

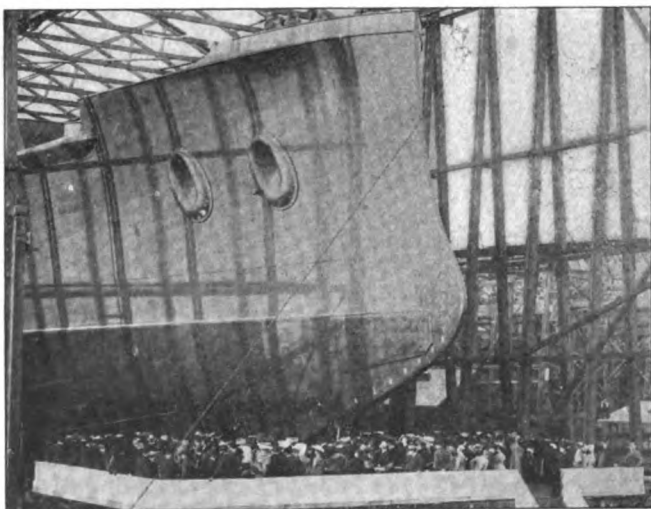
Smoothly, gracefully, without a hitch of any kind, and sharp on time, the new armored cruiser South Dakota, the latest addition to the United States navy, was launched recently from the ways at the Union Iron Works amid the din of steam whistles, the blare of bands and the cheers of thousands of spectators. Christened by a daughter of the state the name of which the huge vessel bears, and in the presence of that state's governor and a delegation which accompanied him, the South Dakota began her career afloat under bright auspices.

After an elaborate luncheon given at the St. Francis by the Union Iron Works, the christening party boarded the transport tug Slocum and went to the ship yard, arriving about 6 P. M., 40 minutes before the short but impressive ceremony. With bared heads the christening party listened to a brief prayer for future success by Bishop W. F. Nichols, and then at a



JUST PRIOR TO THE LAUNCH.

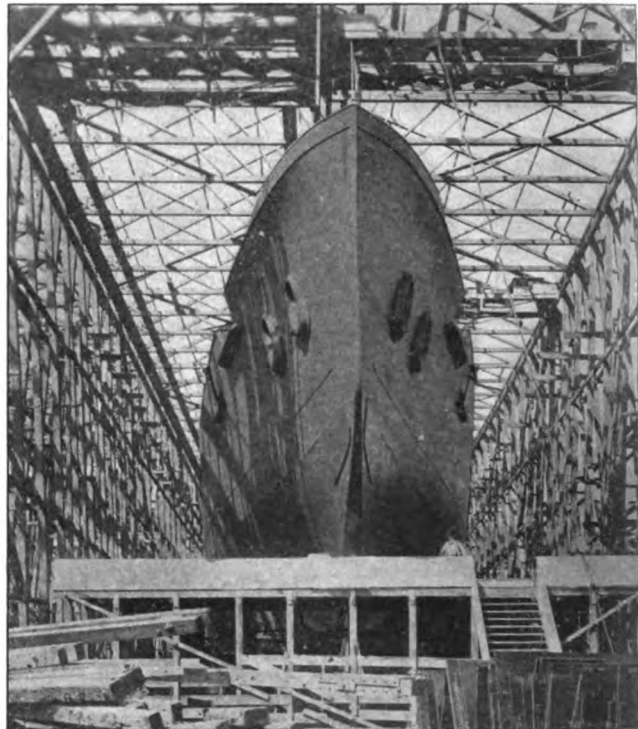
signal from President W. G. Dodd, Miss Grace Mae Herreid, the nineteen-year-old daughter of Gov. Herreid of South Dakota, pressed a little button at the end of an electric wire, which set the complex launching machinery in motion. The electric current permitted a sharp guillotine-like blade to drop on a cord, the severing of which released a pair of heavy



ON THE LAUNCHING STAND.

weights. These, rushing down an incline, struck two spars with heavy blows, knocking out the "dog-shores" which held the vessel back, and the ship released from these started down the ways.

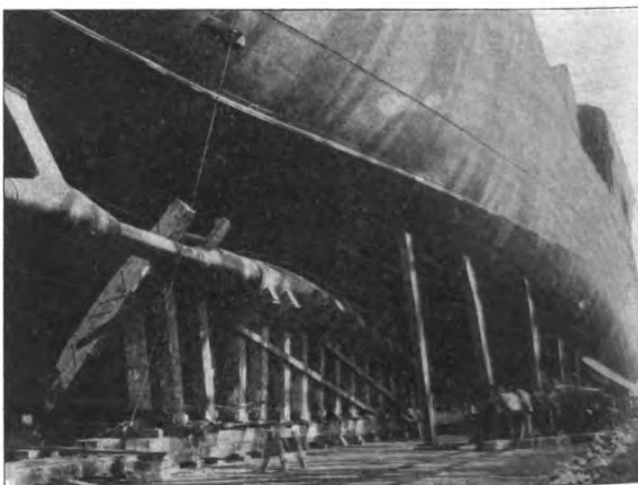
"I christen thee South Dakota!" exclaimed Miss Herreid coolly and in a clear, musical voice, at the same time casting the conventional bottle of champagne against the now receding



BOW VIEW OF THE SOUTH DAKOTA.

hull. The bottle was smashed to atoms, scattering the foaming liquid all over the red plates of the ram bow. The big cruiser was baptized.

As the vessel started down the ways the multitude cheered lustily. Not only the ship yard but all the surrounding docks and seawalls, the neighboring hills in the Potrero and a fleet



STERN VIEW OF THE SOUTH DAKOTA.

of watercraft of all descriptions were crowded with spectators. A variety of steam whistles added their blasts to the din, in which the strains of a couple of brass bands were well nigh drowned. The cruiser made hardly a splash as she went into the water. Her clean, graceful lines cut easily through the waves and, checked at first by a series of chain cables and rope lashings which acted as brakes upon her, she quickly

lost headway and came to a stop not over 150 yards from the ways upon which she was built.

Accompanying Gov. Herreid and the officials of the Union Iron Works on the christening stand were: G. W. Nash, superintendent of schools, and Mrs. Nash; Miss Alda Johnson, a college mate of Miss Herreid; Frank Crane, clerk of the supreme court and chairman of the South Dakota Republican state central committee, and Mrs. Crane; James Brown, a railroad man, and Mrs. Brown, all of South Dakota. Others among the special guests present were: Capt. Leavitt C. Logan, U. S. N., who will command the new battleship Ohio, and Mrs. Logan; Lieut.-Col. George Richards, United States marine corps; Maj. C. A. Devol, U. S. A.; Capt. Thomas A. Nerney, A. L. Hart, E. J. de Pue, United States Indian commissioner; W. A. Jones, chief wharfinger; R. J. Welch and other prominent local residents. Most prominent among those representing the navy was the superintending constructor, John G. Tawrescy, who deserves great credit for his able and efficient work in connection with the South Dakota and other United States vessels building at the Union Iron Works.

The actual work of launching the vessel really began at 4:10 P. M., when the vessel was "rammed up," as it is called; that is, the wedges were driven into place, entrenching the hull on the launching ways. This was finished at 4:44. Twelve minutes later began the knocking out of the shores and at 5:10 the first half of the keel blocks, every alternate one, were knocked out. The last step in the preliminary work, that of knocking out the second set of keel blocks, occupied from 6:10 until 6:38, 104 men being required to get the huge red hull into the water. At 6:40 precisely—high water—the last keel block was split and the ship settled down into the cradle, resting wholly on the launching ways.

There was absolutely no jar, no hesitancy, no roughness of any kind to the event. The ways were thoroughly greased with a layer of stearin, on top of this was a mixture of stearin and tallow, and on top of this a layer of soft soap, the whole making as sure and effective a lubricant as modern ship builders have yet devised.

Like the California, which was launched last April, the South Dakota is one of six identical armored cruisers authorized by the acts of congress of March 3, 1899, and June 7, 1900. The remaining four are the Colorado, the Maryland, the Pennsylvania and the West Virginia. The contract for the construction of the South Dakota was signed Jan. 10, 1901, and her keel was laid on Sept. 30, 1902. Her official speed trials will be held some time next year. Her total cost when complete and ready for sea will exceed \$6,000,000, the details being as follows: Hull and machinery, \$3,750,000; armor, \$1,000,000; armament, \$977,848; torpedo outfit, \$200,000; equipment, \$250,000; total, \$6,177,848.

The South Dakota is built of steel throughout, will carry forty-seven officers and 782 men, and is of the following principal dimensions: Length, 502 ft.; extreme breadth, 69 ft. 6 in.; mean draught, 24 ft. 1 in.; displacement, fully equipped, ready for sea, normal coal supply of 900 tons, 13,680 tons; displacement, full load capacity and 2,000 tons of coal, 15,138 tons. She is to maintain a sea speed of 22 knots. The armor protection of the South Dakota consists of a water line belt 5 to 6 in. thick, barbettes 6 in. thick, turrets 6 to 6½ in. thick, a protective deck 1½ to 4 in. thick, and a water line armor dam filled with corn pith which, after the entrance of a shot, is expected to close up and exclude the water.

The armament will comprise in the main battery four 8-in. breech-loading rifles and fourteen 6-in. rapid-fire guns; in the secondary battery eighteen 3-in., twelve 3-pounder and eight 1-pounder rapid-fire guns, two machine guns, six automatic guns and two 3 in. field pieces. There will also be four submerged torpedo tubes.

LIVERPOOL SHIPPING LETTER.

Liverpool, Aug. 15.—A further development has taken place this week in connection with the Atlantic rate war, the White Star Line having issued a circular to their British and Irish agents stating that they have reduced the third class rates to £2 by all steamers from Liverpool and Queenstown to New York and Boston. There has been suspended, however, the free forwarding of these passengers by New York steamers to Boston, Philadelphia or Baltimore, and by Boston steamers to New York, Philadelphia or Baltimore. From these ports to this country the third class fares are \$15. The North German Lloyd and the Hamburg-American lines also convey passengers to America from Great Britain via the continent for \$10, although Continental passengers still have to pay \$30 to \$40, and the low fares have induced large numbers of people who otherwise would not have been able to cross the Atlantic, the traffic especially from America having thereby received quite an impetus. While the Cunard company, so far as can be ascertained, do not intend to reduce their fares accordingly, there is every reason to believe that important negotiations are proceeding with the object either of meeting this competition or bringing about an arrangement which will practically end the war. Rumors are current as to a conference on the matter having been held this week between Lord Inverclyde, chairman of the company, and Mr. H. Brown, the American agent of the line; and there is a belief that at no distant date the Cunard and Combine lines will agree to suspend rate cutting until a permanent settlement can be arrived at. From inquiries I have made in Liverpool as to the effect of the cheap rates to America it would appear that the effect has not been what was anticipated. Although now and again there have been considerable bookings, it is believed in official circles that on the whole, the season will be found at its close to be very little more than a normal one. A particular feature of the emigration to Canada this year has been the large number of well-to-do artisans and agriculturists who have gone out to settle in the dominion, and the bookings of such have been above the average.

A message from New York has been published here which says that it is known that the German lines would be willing to purchase for a reasonable sum the contract the Cunard Line has with the Austro-Hungarian government, and at the same time buy the Cunard vessels engaged in the service. It is added that this may be the ultimate manner of settlement, but in Liverpool it is considered improbable that the Cunard company will, under such terms, allow themselves to be wholly cut out of the continental trade they have acquired and which has been the chief bone of contention. Time alone, however, will show, as the Cunard officials here decline to say anything. The Hungarian government, after having vainly attempted to secure the support of the Austrian government as against the Austro-Americana Line, has now come to the assistance of the Hungarian Adria Co. (which is allied to the Cunard company), inasmuch as it will concede the reduced railway tariff to Fiume to the latter company only. This will have the effect of depriving the Austro-Americana Line of the Fiume traffic.

Mr. W. T. R. Preston, chief commissioner of emigration for Canada, who is now on a visit to Britain to inspect the Canadian government agencies, says he has just got the complete official figures of emigration to Canada for the past fiscal year. They total 130,000 from Great Britain and the continent, and owing to a slight reduction of American settlers was only 3,500 more than a year ago, but from Great Britain the number of settlers had been 50,000, or 9,000 more than last year, which was the previous best record. The present emigration season was the best ever experienced by Canada. Questioned about the establishment of a subsidized fast Canadian passenger steamship service across the Atlantic, Mr. Preston said he had on good authority, before leaving

London, that the Canadian Pacific railway as well as the Allan Line had given orders for several 17-knot boats to be built. These vessels would render a subsidized service unnecessary, but, of course, he said the extra speed of the vessels to be put on the Canadian service by the Canadian Pacific railway and Allan Line might justify an increase in the government mail subsidy.

Among Liverpool ship owners considerable feeling is being displayed in consequence of the attitude of the British government in regard to Russia, but the discussion and statement by the premier in parliament has slightly improved the confidence of the public. Only recently Messrs. Alfred Holt & Co. have issued a notice to shippers to the effect that owing to the uncertainty existing as to what is lawful cargo for Japan, the regular weekly joint service of the Ocean Steamship Co. and the China Mutual Steam Navigation Co. to Japan is suspended until further notice. Cargo for Japan of an undoubtedly lawful character only will, however, be accepted to be forwarded with transshipment, and shippers will be required to sign a declaration that the goods are intended for peaceful purposes, and to declare the consignees on the bills of lading. Only on these terms will the monthly steamer extending to British Columbia continue to carry cargo to Japan without transshipment. The P. & O. Co. have also announced that whilst they will continue to run their steamers to Japan to bring home cargo from that country, they will not ship any cargo for Japan. The opinion has been strongly expressed in Liverpool that if the government do not adopt a firmer attitude the British shipping trade with the far east will be crippled and eventually secured by the Germans. For long enough the German shipping companies have been endeavoring to wrest this trade from Britain, and everything seems to point to the fact that Russia is now assisting Germany in still further transferring the trade from the British lines. Stronger proof of this could not be found than the statement made on the very best authority that whilst British steamship companies have for some time past refused continental cargoes for the far east, and especially for Japan, which might have laid them open to the suspicion of contraband, similar goods have been accepted without any hesitation by the German companies, which seem to be able to secure the protection which is not vouchsafed to British lines. Is it, therefore, to be wondered at that the situation is being viewed with alarm by ship owners and brokers who are in any way connected with this particular trade.

Another conference of the general committee of the International Sailing Ship Union is to be held at the London Chamber of Shipping on the 30th inst., and yesterday the Liverpool members appointed delegates. Since its formation the union has done, it is said, splendid work in raising freights to a more remunerative level.

The Challenger, which was America's representative in the recent race for the Harmsworth cup in England, has arrived in New York. Her first appearance since her return will no doubt be as one of the contestants in the races for the Gold Challenge cup, which will take place in New York city on the Hudson river sometime in September. While the *Vingt et Un II*, a sister craft, made such remarkable time, it is believed that the Challenger will do as well, if not better.

Work has been started by Lyall & Sons on the first group of the fourteen sheds to be erected on the wharves at Montreal for the Harbor Commission. The sheds now under construction are to be situated at the foot of St. Peter street where the sheds hitherto used by the Allan Line stood.

The Alaska Steamship Co., Seattle, Wash. have latterly been using oil as fuel on its steamers instead of coal but they advise that their experience as yet has not been sufficient to enable them to make any comparison.

SCOTCH SHIPPING LETTER.

Glasgow, Aug. 16, 1904.—The select committee of the house of commons which is considering the question of the application of British regulations to foreign ships trading to and from British ports, has just heard the evidence of Capt. Chalmers of the Board of Trade. He stated that the surveyors of the Board of Trade had instructions to take cognizance of foreign ships at British ports loading with coal. If they had any suspicions as to the probability of explosion communication was made with the consul of the country to which the ship belonged. In recent years there had been so many explosions on vessels carrying gas-coal that the board had decided to take stronger measures and to insist upon proper ventilation. It was a question whether the absence of proper ventilation could be described as "defective equipment or improper loading." Since this decision of the Board of Trade a number of foreign vessels had been warned, and if they failed to provide proper ventilation they were detained when they returned to a British port for coal. The surveyors had instructions to watch foreign vessels loading at the out-ports and he thought that on the whole the supervision was very effective. The surveyors were experts and could tell intuitively by looking at a vessel whether she was overloaded or not. They could perform that work better than a naval architect working out the question in figures. At Cardiff the surveyors were assisted by a number of boatmen who, after employment for a couple of years, became expert and were capable of telling within three or four inches whether a foreign vessel was overloaded. In the event of these men reporting a foreign ship as being overloaded the surveyors took means to have the ship properly measured. It was very often found that these boatmen were within 2 in. of the correct measurement. Cardiff, he admitted, was more easily dealt with than ports on an open river could be. Replying to the questions of several members of the committee he said he did not think it was a necessity for British ports that we should insist on foreign ships having a load line. If they had marks the surveyors would not be so alert. He admitted, however, that the best solution of the difficulty would be the fixing of an international load line. In the case of British ships he thought that when once they went below the load line the element of danger crept in. This concluded the hearing of evidence during this session, the inquiry being adjourned.

The British government scouts, Pathfinder and Patrol, whilst under construction, are insured for £250,000 each, and another insurance has been effected on behalf of the admiralty. This is in connection with the engines, boilers and auxiliary machinery now being built at Clydebank in the yard of John Brown & Co., Ltd., to be fitted on board the *Africa* building at the Chatham naval dockyard. The total amount of insurance is £200,000 and being exclusively on the machinery is in addition to amounts already effected on the hull of the vessel. By this insurance underwriters relieve the builders of all liability for loss or damage until the delivery of the warship to the government, which is expected to take place about two years hence. The machinery, after being finished in accordance with admiralty requirements, will be conveyed in sections from Clydebank to Chatham, and after being fitted, the chief risks of underwriters after the successful launch of *H. M. S. Africa*, will be those of trial trips prior to the vessel being finally handed over complete to the government.

The casualties to vessels of 500 tons gross register and upwards, noted in the Loss book during July, numbered 315, as against 357 for 1903, 327 for 1902 and 378 for 1901. There were total losses that month of two British sailing and six steam vessels, the tonnages of which were respectively 2,276 and 11,430. Of foreign total losses there were three sailing vessels and two steamers, the aggregate tonnage being respectively 2,197 and 12,309. British partial losses during the

month consisted of eighteen sail and 141 steam; foreign vessels under the same category comprising twenty-one sail and 118 steam.

The four County cruisers built on the Clyde—Antrim, Argyll, Carnarvon and Roxburgh—are all making good progress in their fitting out. The trials of these vessels would have been completed by this time had they been built to the original specifications laid down by the admiralty, but when the hulls had been completed in most of them the admiralty decided to strengthen the fighting power of the forward battery, and instead of the 6-in. guns in the forward casements there will be 7.5-in. quick-firing guns in barbettes on each side. These changes have caused a large amount of extra work, the top sides having to be cut back and the original casements removed.

The Glasgow ship Cedarbank, 2,649 tons, belonging to Messrs. Andrew Weir & Co. of this city, recently arrived at Queenstown from Melbourne with wheat after a passage in the fast time of eighty-eight days. This compares with the passage of the barque Cloch, which recently arrived at Queenstown from Melbourne after a passage of 160 days. The captain of the Cedarbank stated that a fleet of ships numbering fifty-four left Melbourne some time previous to his sailing and have not arrived yet at any port. His outward passage from Philadelphia to Melbourne only occupied eighty-four days. When the Cedarbank sailed from her port of loading she ran right south of New Zealand as far as 54° and rounded Cape Horn on the 28th day out from Melbourne. A moderate breeze was experienced in the run to the equator subsequently light airs were met with until Florida was sighted, from thence moderate winds to Queenstown.

An interesting discussion occurred at last meeting of the Glasgow Chamber of Commerce on the subject of American and South African freights. Col. Brock reported that the foreign affairs committee had been considering the question of shipping rates to South Africa. They had had a letter from Mr. Calder of Cape Town in which he alleged that American goods were displacing British goods there. American manufacturers sent goods from New York to South Africa at 15s freight whereas for goods sent from Great Britain to South Africa the rates varied from 31s 3d to 47s 6d per ton, although the distance from New York to South Africa was 600 miles more than from Britain to South Africa. A similar question had been raised some months ago with regard to New Zealand, but in that case the German government were granting shipping subsidies to the German lines and British manufacturers competing with the foreign subsidies had to cut their prices. In the present case, however, there was no question of subsidies. Their correspondent pointed out that in America the rebate system with regard to freights was illegal. By a majority the committee decided to pass the following resolution:

"Having regard to the letter from Mr. Calder calling the attention of the chamber to the important difference existing in rates of freight in favor of merchandise of American origin, as compared with rates of goods of British origin, the directors of the chamber are of opinion that such differential rates are inequitable and seriously detrimental to the interests of British manufacturers and shippers, and that a copy of this resolution be sent to the Board of Trade."

Mr. W. F. G. Anderson of the Anchor Line said a great deal had appeared in the newspapers about this question of freights to South Africa. The particular grievance at the present time appeared to be that the rates from American ports to South African ports were very much less than from British ports. He thought that before they communicated with the Board of Trade, if they communicated with the Board of Trade at all, they ought to be a little better informed in regard to the state of matters which brought about this inequality in regard to rates. He had no doubt that the American ship owners interested in these vessels had no desire

to carry freight from American ports at half the rate current from British ports. There must be some reason for it, and it was quite evident to anyone who knew anything about ships that the present rate from American to South African ports could not be remunerative. The Glasgow chamber must either desire that the American rates should be raised or the British rates reduced, and British ship owners interested in these vessels would not take 15s if they could get 30s. There must be some circumstance which prevented them getting the higher rate. He was only theorizing about it, he did not know the facts of the case but he thought that if they desired to go further into the question it would be only reasonable that they should communicate with the ship owners and ask for any explanation they might be disposed to give. There was a great outcry in regard to freights to South African ports. They might or they might not be too high. It was necessary, however, to bear in mind the state of that trade. There was no return cargo from South Africa. Vessels called at a number of ports there. They often met with great detention and they had either to be sent home in ballast or to the River Plate or Indian ports for return cargoes. There seemed to be great objection to these conferences of ship owners and to what was described as the rebate system, but there was a reason for everything, and the reason for such conferences was not confined to the South African trade. He did not see what right the Board of Trade had to interfere. If four or five ship owners chose to make arrangements amongst themselves he did not see that the Board of Trade had any right to interfere unless the government represented by the Board of Trade conferred some favor on the ship owners. The government did not confer such favor and he was at a loss to know how the Board of Trade could be expected to influence or control the rates of freights of ship owners. He thought that until British shippers had exhausted their remedies and done all in their power in the matter it would be very injudicious to approach the Board of Trade.

Whatever may be the state of the balance sheet in other ship yards those in Germany seem to be satisfactory. Last year the Vulcan Co. at Stettin paid a dividend of 14 per cent; the J. C. Tecklenborg Ship Building Co., Bremerhaven, 12 per cent; the G. Seebeck Ship Building & Machine Works Co., 10 per cent; the Bluhm & Voss Co., Hamburg, 9 per cent; the Rickmers Co., Bremen, 7 per cent; the Flensburg Ship Building Co., 14 per cent; the Reiherstieg Ship Building & Machine Works Co., Hamburg, 10 per cent; the Neptune Ship Yard, Rostock, 8 per cent.

The Kelly-Spear Co., Bath, Me., has two schooners and four barges on the stocks. The four-masted schooner George W. Truit, Jr., is 175 ft. keel, 38 ft. beam, 13 ft. deep and is building for Hudson & Bro., Norfolk, Va. Capt. J. R. Erskine will command her. The schooner John Bossert for Lewis Bossert & Son, Brooklyn, N. Y., also a four-master, is 158 ft. keel, 36 ft. beam and 12½ ft. deep; both are lumber vessels and will be ready the last of October. Two of the barges are for the Penn Gas & Coal Co., Pittsburg, Pa., and two are for the Staples Coal Co., Taunton, Mass. A keel for another four-master has been laid.

Vessels classed and rated by the American Bureau of Shipping in the Record of American and Foreign Shipping are as follows: American screw George W. Elder, American screw Ontario, American schooner Grace A. Martin, American schooner Margaret Haskell, American schooner Vanlear Black, American barkentine Rachel Emery, American three-masted schooner Joel Cook, American three-masted schooner Julia P. Cole, American three-masted schooner Mary Sanford, American barge Mingo, American barge Newburgh and American barge Spring.

NEW WORLD'S RECORD FOR MOTOR BOATS.

The world's record was broken and a new one established by the *Vingt et Un II.* at the power-boat races of the New York Yacht Club held off Newport, R. I., on Thursday, Aug. 18. It was one of the greatest power-boat races yet witnessed in American waters. A strong head wind was blowing from the northwest for the greater part of the journey and the water was lumpy throughout the entire race. Over a course of 16 nautical miles—twice around a course of 8 miles—the *Vingt et Un II.*, the *Swift Sure* and the *Mercedes* were sent off at 12:10 m. in one class while the smaller boats, the *Neon* and *Wayfarer*, formed the second class, starting at the same time as the others. Mr. C. H. Hamilton was at the wheel of the *Vingt et Un II.*, Capt. Nat. G. Herreshoff the *Swift Sure*, and a professional at the wheel of the *Mercedes*. The *Mercedes* was first to cross the starting line, the *Swift Sure* second, fully one length away, and the *Vingt et Un II.* last. Before the first mile was covered the *Swift Sure* was leading by a good distance, the *Vingt et Un II.* was second, having passed the *Mercedes*, which was well astern. They continued in this order, and at the end of the first 8 miles the *Swift Sure* was still leading, but the *Vingt et Un II.* was beginning to bear down on the leader and in turning the 8-mile mark the *Swift Sure* led by only 8 seconds, with the *Mercedes* almost a mile astern, 2m. 58s. behind the leader. The interest and enthusiasm was really centered in the second round. The *Vingt et Un II.* was slowly gaining on the *Swift Sure*, and after passing the 4-mile mark on the second round passed the *Swift Sure* and was now leading by one or two boats' lengths. The excitement amongst the spectators was now of the keenest nature. After gaining the lead the *Vingt et Un II.* was never headed, although the *Swift Sure* had made some little gain on the *Vingt et Un.* but owing to her steam having dropped she found it utterly impossible to overhaul the *Vingt et Un.* It required the *Vingt et Un II.* just 42m. 58s. to cover the course; *Swift Sure*, 43m.; *Ois* and the *Mercedes*, 49m. 28s.

Interest was also manifested in the boats of the smaller type—the *Neon*, owned by Nat. G. Herreshoff, Jr., and *Wayfarer*, owned by Mr. John H. Hammond, Jr. They went over the course but once, making 8 nautical miles. The *Neon* was first to cross the line, and had the race well in hand, and won easily from the *Wayfarer*, but lost on the time allowance. It was indeed a great day for the power-boats, and the performance of the *Vingt et Un* is one that may not be surpassed, if equalled, again this season. This is the second time Capt. Nat. G. Herreshoff has tried his experimental launch, the first being at the power-boat races of the Atlantic Yacht Club a few weeks ago, when the *Standard* was the only competitor, the *Vingt et Un II.* at that time having been in another class by herself. The *Vingt et Un II.* made the trip from New York city to Newport for the race and the *Mercedes* made a special trip from Boston to be present, and Mr. H. L. Bowden was very confident of winning with her, so much so that he and his friends were anxious to make wagers on the outcome of the race, but fortunately no wagers were placed. Those on board the *Mercedes* wore rubber coats that were drawn tight under the chin and around the neck of each was a life preserver. Those in the *Vingt et Un II.* and the *Swift Sure* merely wore oilers and at the finish all were pretty well wet.

As a glance at the summary will show it will not be a very easy matter to beat these figures, although there is considerable talk of some very fast boats that have had some private spins over a regularly measured mile, which will compete in the coming Gold Challenge cup event to be held in New York city sometime during September. The previous best record made by a motor-boat was that of the *Trefle-a-Quartre*, at Monte Carlo, when in competition she made 20½ statute miles.

Had the wind not been so strong and the water less lumpy the time would have been even far better. The summary:

Newport, R. I., Thursday, Aug. 18.—Course of the New York Yacht Club race for power-boats; start, 12h. 10m.; course, 16 nautical miles.

Name.	Owner.	Finish. H.M.S.	Elapsed Time. H.M.S.	Correct Time. H.M.S.	Knots per hour.	Statute miles per hour.
<i>Vingt et Un II.</i>	W. L. Brooks	12 52 58	0 42 58	0 41 22	22.32	25.67
<i>Swift Sure</i>	Capt. N.G. Herreshoff	12 53 01	0 43 01	0 43 01	22.29	25.64
<i>Mercedes</i>	H. L. Bowden	12 59 28	0 49 28	0 46 22	19.41	22.32

First round—8 miles.

	Time. H.M.S.	Knots.	Statute miles.
<i>Vingt et Un II.</i>	0 21 42	22.07	25.38
<i>Swift Sure</i>	0 21 34	22.21	25.54
<i>Mercedes</i>	0 24 32	19.05	21.91

Second round—8 miles.

	Time. H.M.S.	Knots.	Statute miles.
<i>Vingt et Un II.</i>	0 28 16	22.58	25.96
<i>Swift Sure</i>	0 21 27	22.38	25.74
<i>Mercedes</i>	0 24 56	19.25	22.13

The *Swift Sure* allowed *Vingt et Un II.* 1m. 36s.; *Mercedes*, 3m. 06s.

Small power-boats—Start 12h. 10m. Course 8 miles.

Name.	Owner.	Finish. H.M.S.	Elapsed Time. H.M.S.	Corrected Time. H.M.S.
<i>Wayfarer</i>	N. G. Herreshoff, Jr.	1 00 14	0 50 14	0 54 14
<i>Neon</i>	J. H. Hammond, Jr.	1 00 14	0 50 14	0 54 14

The *Neon's* rating is 33.60 and *Wayfarer* has not been measured. On corrected time *Wayfarer* is the winner by 15m. 35s. and beats *Neon* on elapsed time 3m. 56s.

GOLD CHALLENGE CUP RACES.

Another race for the American Power Boat Association Gold Challenge cup will be held about Sept. 15, 16 and 17, although as yet no definite details as to exact dates are obtainable. The Columbia Yacht Club of New York city, present holder of the cup, has waived the clause in the deed of trust whereby all challenges were to be made six months prior to the time of a series of races, and the sanction of the American Power Boat Association being obtained, gives another opportunity for bringing together the most prominent boats that have appeared this season. The course will be from a starting line opposite the Columbia Yacht Club up the Hudson river not to exceed 20 nautical miles and return. The Manhasset Bay Yacht Club has been the challenger, naming as its representative in the race the *Shooting Star*, owned by Mr. Harry A. Lozier, Jr. of New York city. At the last series of races held last June the number of entries were numerous, but when the time came for the actual test there were but two boats to compete for the Gold cup—the *Standard* and the *Water Lily*. Many of those who had entered were unable, through lack of completeness in many cases, to compete, and in the interest of the sport the Columbia Yacht Club decided to waive the clause as regards challenges and thereby bring together the numerous speedy craft. The interest which many owners have manifested, when it became known that such action was to be taken, bids fair to make this coming event one of the most interesting of any held so far this season.

Some of the boats prominently mentioned in connection with the event are the *Shooting Star*, *Marcirine II.*, *Vingt et Un I.*, *Vingt et Un II.*, *Challenger*, *Water Lily*, *Mercedes*, *Autowin*, *Comanche*, *Flip*, *Standard*, *Japansky*, *Swift Sure*, *Alert* and *Boomerang*. The *Napier-Minor*, which won the Harmsworth cup in England, may possibly be a competitor, as it is expected Mr. S. F. Edge will bring her over and enter her from some leading yacht club of England. Commodore Harrison B. Moore of the Atlantic Yacht Club, New York, is also expected to enter his fast boat, which is about completed, and which, it is predicted, will possess remarkable speed. Hollander & Tangeman, who, though unsuccessful with their previous creations, will also have an entry. A. Massenet, American representative of the French concern of Panhard & Levassor, is also expected to have his boat completed in time, and many others that have been prominently mentioned. This should make one of the best events ever held

for motor boats and the chances are that a new world's record will be established. The series of races will be in charge of three judges; one selected by the challenging club, the Manhasset bays, who have named Col. Frederick A. Hill; one to be selected by the Columbia's, and these two will select a third. According to the declaration of trust the match is open to power-boats of all kinds—gasoline, naphtha, steam, electric or kerosene. The match consists of three races and no club shall enter more than one boat. Any recognized yacht club in the United States which is a member of the A. P. B. A. and any organized yacht club of good standing in any other country shall be eligible to enter a boat as representing their club. Boats whose rating under the rules of the A. P. B. A. shall not be less than 35 ft., and whose water line length shall be not less than 25 ft., but in no case shall the rating be less than the water line length. All matches are sailed under the rules and regulations of the American Power Boat Association. The following are the yacht clubs who are members of the association who are eligible to a representative each to compete for the cup: American Yacht Club, Albany Yacht Club, Atlantic Yacht Club, Audubon Yacht Club, Brooklyn Yacht Club, Chippewa Bay Yacht Club, Columbia Yacht Club, Harlem Yacht Club, Hartford Yacht Club, Hempstead Bay Yacht Club, Indian Harbor Yacht Club, Jamaica Bay Yacht Club, Knickerbocker Yacht Club, Manhasset Bay Yacht Club, Mattebessett Canoe Club & Middletown Yacht Club, Newark Yacht Club, New Rochelle Yacht Club, Norwalk Yacht Club, Passaic River Yacht Club, Pavonia Yacht Club, Rhode Island Yacht Club, Riverside Yacht Club, Riverton Yacht Club, Sackett's Head Yacht Club, Shattemuc Yacht & Canoe Club, Shenandoah Yacht Club, Springfield Yacht Club, Stamford Yacht Club, Thousand Island Yacht Club, Yonkers Yacht Club, Yonkers Corinthian Yacht Club, New York Athletic Club (yachting department), South Boston Yacht Club, Cape May Yacht Club and Philadelphia Yacht Club.

THE ADIOS MAKES FAST TIME

At the motor boat races held at Alexandria Bay, N. Y., on Wednesday, Aug. 10, the spectators were given an opportunity of seeing the only motor boat that has ever beaten the Standard and it was the Adios. The race meet was given under the auspices of the Thousand Island and Chippewa Bay Yacht clubs and the attendance was very large, composed mainly of those who are summering at this well known resort. The course was one of $14\frac{1}{2}$ miles. The first event was for boats belonging to members of the clubs giving the event only. The boats not to measure over 30 ft. All interest was centered in the boat Pink owned by Mr. J. Wainwright of Philadelphia, Pa., a sister boat to the Adios. The Pink got off well in the lead and was never headed. Her elapsed time for the distance was 55 min. 49 sec. The chief contest, however, was for the handsome trophy offered by Commodore Gilbert L. Rafferty of the Thousand Island Yacht Club, the contest for which was open to any gasoline boat without any handicap or time allowance. This event brought out the Adios, owned by the builder and designer, Mr. H. J. Leighton of Syracuse, N. Y., and the Papoose, owned by Capt. Fitz Hunt of Alexandria Bay. This being the first appearance of the Adios for sometime a great deal of interest was manifested in her. She went over the course in 39 min. and 44 sec. beating the Papoose by several minutes. The Adios averaged 20 knots an hour or 25.18 statute miles. The time of the Standard in her last race was 21.136 knots or 24.29 statute miles over a 20-knot course. She is the only boat that ever defeated the Standard and a match race between these two fast boats would be highly interesting. The Adios is equipped with a 120-H. P. Leighton motor; length over all, 55 ft.; L. W. L., 55 ft.; beam, 6 ft. 6 in. Her engine makes 475 revolutions per minute. The wheel is three-bladed

of 32 in. diameter and 72 in. pitch. The Pink is 22 ft. over all, 4 ft. beam and equipped with a 7-H. P. Leighton engine. The Papoose was equipped with a 24-H. P. engine. The Adios and Pink are built more or less on the conventional flat-stern torpedo boat model.

NEW YORK YACHT CLUB.

The oldest and most influential yacht club in the United States and with but one exception in the world is that of the New York Yacht Club. Known from one end of the globe to the other its standing in the yachting world is foremost. Organized in 1844 it has always been looked to as the parent organization in yachting circles. The late John C. Stevens was its first commodore and the club house which they had and which was, until recently, located at Hoboken, N. J., adjoining the Stevens estate, was removed and moored at Glen Cove, Long Island. On Feb. 16, 1865, Messrs. Edwin A. Stevens, Ambrose C. Kingsland, Alexander Major, Robert S. Hone, William H. McVickar, Anson Livingston and Hamilton Morton incorporated the club under the state laws of New York, making the headquarters from that time in New York city. It was this club which sent over to England the good old America that brought back with her the much coveted trophy, "the blue ribbon of the seas," that so many of England's representative fast yachts have tried from time to time to take back. The New York Yacht Club has always taken care to see that the cup was retained, however, and as guardian over the cup has always put forth every effort to secure nothing but the best, the most speedy of yachts, to represent America in all contests. There is no club that possesses a larger membership and none that has the enormous amount of wealth as possessed by its members. Amongst its fleet are to be found yachts and steamers that have time and again won laurels in many hotly contested events. When the war with Spain was inevitable and our government was in need of the smaller type of fast steamers the New York Yacht Club came forward and many of the floating palaces, as they were nothing less, were offered. One of those accepted was that of the Corsair, which was owned by Mr. J. Pierpont Morgan, and which made such a remarkable name for itself during the entire engagement, both when Cervera's fleet was bottled up and when he made his bold attempt to escape.

To make mention of any one single prominent yachtsman who is not a member of this club is almost an impossibility, and many of Europe's prominent leading yachtsmen are either honorary or active members of the club. Many prominent officers of the United States navy, from the admiral down, are members of the club. The largest vessel of the fleet is that of the Valiant, owned by Mr. William K. Vanderbilt. She measures 332 ft. length over all. The next is that of the Margarite, owned by Mr. Anthony J. Drexel of Philadelphia, Pa. She is 323 ft. length over all. The next is the floating palace of Mr. James Gordon Bennett, the Lysistrata. She is 314.6 ft. length over all. The Nahma, owned by Mrs. Robert Goellet of New York, with length over all of 306 ft. The magnificent Corsair, a sister boat to the one turned over to the government, owned by Mr. J. Pierpont Morgan, is next in size with length over all of 304 ft. There are no less than 162 vessels in the fleet of steamers and many of them are the speediest afloat. In this fleet are to be found such boats as the Arrow, the Hauoli, the Kanawha, winner of the Lysistrata trophy, the recognized blue ribbon of the seas for power craft; the turbine Tarantula. Many there are that have been seen in numerous parts of the world—the Margarite of Mr. A. J. Drexel, the Erin of Sir Thomas Lipton, The North Star of Mr. Cornelius Vanderbilt, who has recently returned; the Oneida on which the owner, Mr. E. C. Benedict, has time and again entertained Ex-President Grover Cleveland; The

Nourmahal, Col. John Jacob Astor; the Niagara, Mr. Howard Gould; the America, Mr. William Zeigler, who fostered the Zeigler expedition to the north pole; the Conqueror, Mr. F. W. Vanderbilt; Satellite, Mr. August Belmont; the Valiant, Mr. W. K. Vanderbilt, and a number of others too numerous to mention.

The fleet of schooners numbers twenty-five, many of which are possessed of auxiliary motors; the single mast and yawl fleet numbers 147, of which ninety are keels; two fin keels and fifty-five center-boards; twenty of this fleet are also possessed of auxiliary motors. The fleet of launches numbers forty-seven, of which five are naphtha, one alco-vapor, one electric motor and the balance gasoline. The active membership in the club was, on Jan. 1, 1,750 members. This was exclusive of navy members, 387; flag, five; honorary, thirty-two. There are 105 life members. The ex-officio honorary members of the club are the president of the United States, secretary of the navy, secretary of the treasury, collector of the port of New York, admiral North Atlantic station, commandant navy yard, New York; commodore, vice-commodore, rear-commodore, secretary and treasurer of the Royal London Yacht Club; the commodore, vice-commodore, rear-commodore and secretary of the Royal Harwich Yacht Club; the admiral, vice-admiral of the Royal Cork Yacht Club. The honorary members are: His Imperial Highness the Grand Duke Alexis of Russia, Commodore Prince Bernadotte, R. S. N. and Count of Wisborg; Hon. William J. Wallace, United States Circuit Court of New York; Rear-Admiral Stephen B. Luce, U. S. N.; Rear-Admiral Henry Erben, U. S. N.; Capt. Alfred T. Mahan, U. S. N.; Admiral George Dewey, U. S. N.; Sir Thomas J. Lipton, Bart., K. C. V. O.; Hon. Elihu Root; Rear-Admiral Robley D. Evans, U. S. N.; Hon. John Davis Long; Mr. Nathaniel Greene Herreshoff; His Imperial Majesty the German Emperor; His Royal Highness Prince Henry of Prussia. The officers and standing committees are as follows: Commodore, Frederick G. Bourne; vice-commodore, Henry Walters; rear-commodore, Cornelius Vanderbilt; secretary, G. A. Cormack; treasurer, Tarrant Putnam. Regatta committee: Messrs. S. Nicholson Kane, chairman; Newbury D. Lawton; E. H. Wales, secretary to committee; measurer, Mr. Charles D. Mower. Committee on admission: Messrs. Henry C. Ward, chairman; Cornelius Vanderbilt, Tracy Dows, Frederic Gallatin, Theodore C. Zerega, secretary to committee. House committee: Messrs. Thomas A. Bronson, chairman; Henry Sampson, Jr., J. Lorillard Arden, secretary to committee. Library committee: Messrs. Lewis A. Stimson, Thomas A. Bronson, Francis W. Belknap. Fleet captain, Commander J. D. Jerrold Kelley, U. S. N.; fleet surgeon, John McG. Woodbury, M. D.; Committee on club stations, the flag officers ex-officio: Messrs. Cord Meyer, Maxmilian Agassiz, Henry H. Rogers, Edward R. Ladew, William Lanman Bull, Charles Lane Poor, William H. Thomas, Augustus C. Tyler, Harrison B. Moore, Henry C. Ward.

The club house is located at Nos. 37 to 41 West Forty-fourth street, New York, and is one of the handsomest club houses in the United States. Everything in the way of architecture and interior furnishings gives it the appearance of a nautical institution and its furnishings are to say the least elaborate and very costly. In the model room are to be found not alone models of the various competitors for the America cup but many other craft, including both sail and steam.

YACHT FOR CANADIAN GOVERNMENT SERVICE.

A very interesting transaction in the yachting world is the sale of the steam yacht Speedy II, formerly owned by Mr. C. G. Conn of Elkhart, Ind., to the Canadian government, which was brought about through the agency of Messrs. Gardner & Cox of New York. The Speedy is a twin-screw steel

vessel, having a straight stem, and being in general appearance similar to a dispatch boat. She was built in Scotland in 1896 and is of the following dimensions: Length over all, 125 ft.; length between perpendiculars, 115 ft.; beam, 20 ft.; draught, 10 ft. She has two triple-expansion engines of 500 H. P. and two water-tube boilers. She is well supplied with auxiliary machinery and her engines will at 110 revolutions produce a speed of 12 knots. Her bunker capacity is large and she is an excellent sea boat, in every way suitable for extended cruising. She is lighted by electricity, heated by steam and is fitted with the most modern plumbing and in every respect her equipment is complete and elaborate. Her accommodation for a vessel of her size is remarkably large, there being a large stateroom and chart room on the upper deck, as well as galley, pantry and dining saloon. On the lower deck there are four staterooms in addition to the quarters for officers and crew. As stated this boat is to be used by the Canadian government on the lakes and will no doubt attract considerable attention as she is of very fine appearance and novel design.

THREE MONTHS' WASTAGE OF VESSELS.

Lloyd's record of vessels totally lost and condemned during the quarter ended Dec. 31, 1903, as reported up to July 26, 1904, are given in the accompanying table. The table shows that nineteen vessels of 7,794 tons were abandoned at sea; thirteen vessels of 7,400 tons were broken up and condemned; nine vessels of 13,034 tons were burned; twenty-four vessels of 14,458 tons were lost through collision; eighteen vessels of 10,577 tons foundered at sea; two vessels of 1,542 tons were lost; twenty-four vessels of 25,101 tons were missing; 114 vessels of 79,755 tons were wrecked, making the total wastage 223 vessels of 159,661 tons. Of this total sixty-one vessels of 72,125 tons were steamers and 162 of 87,536 tons were sailing vessels. These figures are exclusive of vessels trading on the Great Lakes. The following table shows the steam and sailing vessels owned according to Lloyd's register by various nations and the wastage during the three months indicated:

Flag.	Steam and sail vessels owned according to Lloyd's Register book, 1903-1904.		Total wastage three months ended Dec. 31, 1903.	
	No.	Tons.	No.	Tons.
British—United Kingdom	9,152	14,889,571	43	48,153
—Colonies	1,982	1,116,803	13	6,262
America, United States of	2,981	2,480,981	26	19,086
Austro-Hungarian	296	578,697	2	2,692
Danish	799	581,247	7	2,058
Dutch	458	658,845	3	1,316
French	1,355	1,622,016	8	11,005
German	1,898	3,283,247	11	9,468
Italian	1,226	1,180,335	13	8,292
Norwegian	2,218	1,653,740	49	30,071
Russian	1,299	809,648	7	2,184
Spanish	595	764,447	2	919
Swedish	1,514	721,116	22	8,820
Other European countries			7	2,546
Central and South America			1	849
Asia			9	5,886
Other countries			..	.....
Totals			223	159,661

Cable advices are to the effect that the British admiralty has notified Clyde ship builders to tender for the construction of two battleships of 16,500 tons displacement. The admiralty is evidently in a hurry to get the vessels started as the tenders must be ready by Sept. 9 which is unusually short notice. It is stated that they are to surpass in armament and armor anything afloat.

The New Jersey Central railroad ferryboat Elizabeth will be launched at Wilmington, Del., on August 11.

MR. C. B. ORCUTT ON OUR MERCHANT MARINE.

One of the very first speakers to appear before the Merchant Marine Commission when it began its tour through the country under congressional authority to inquire into the state of American shipping in the foreign trade and to ascertain a remedy therefor was Mr. C. B. Orcutt, president of the Newport News Ship Building & Dry Dock Co. Mr. Orcutt told the commission that if it was not at that time advised as to the nature and seriousness of the disadvantage under which American ship-owners were laboring they would no doubt be fully informed on that point before they had concluded their hearing. They have indeed been so informed from the highest possible sources. Mr. Orcutt in his preface said that it would be necessary to remove the present serious handicap under which owners of American vessels are suffering and to put them on a reasonable parity with the vessel owners of other nations before any substantial increase could be secured in the number of American vessels for service in the foreign trade. As a primary disadvantage he referred to the relative costs of vessels built in this country and abroad. An ordinary freight carrying steamship termed a tramp can be constructed in England for about 50 per cent less money than in the United States. It has, therefore, to earn a dividend of 50 per cent upon capitalization, to which must be added the further advantage that a vessel sailing under a foreign flag can be manned and fed at a much lower cost than under the American flag. Mr. Orcutt's talk, while very brief, was very much to the point, and he comprised in the few sentences the whole story of the ascendancy of Britain as a sea power and the corresponding decline of the United States as a ship owning nation.

"If the present situation is to be changed for the better," said Mr. Orcutt, "it will manifestly have to be done by national legislation in one form or another, the net result of which shall be to equalize, within reasonable bounds, the condition of competition under which American vessels must engage in the foreign trade. The most immediate and effectual method of securing the needed relief would seem to be through direct aid to vessels in the ocean carrying trade, such assistance to be wisely planned to further enlarge the ocean mail service, to promote commerce, increase the foreign trade of the United States, provide auxiliary cruisers, transports and seamen for government use in time of war. Couple with the foregoing a discrimination, where possible, in import duties on goods carried in American-built vessels sailing under the American flag, and we shall witness a revival in American shipping which will largely promote the political and commercial interests of this country."



MR. C. B. ORCUTT.
President Newport News Ship Building & Dry Dock Co.

"The basis of the English navigation act under which England grew to commercial ascendancy upon the sea was the principle of reserving the carriage of English trade to English ships. It will not be possible to apply such a principle to our conditions at the present time without serious disarrangement of our ocean trade; it will, however, be well to consider that in 1789, the principle of the English navigation act was applied to our shipping in a modified form and in a manner which did not disarrange ocean carriage—by a system of discrimination in duties, aided by a system of tonnage taxation—ships of other nations were still allowed to carry our ocean commerce, but a discount in duties was allowed to American ships. The discount so allowed was not enough to provide for the immediate development of our shipping to a point where it was able to do all of the nation's sea carrying; it, however, promoted constant growth under this policy and in a period of thirty years secured a tonnage sufficient for the country's needs. From a political standpoint such a measure would have much to commend it as it could not be constantly objected to by either Democrats or Republicans.

"The trading ships of this country, our tramp steamers of the future, will have great carrying capacity and slow speed, and will be designed and constructed with a view to economical management. Such ships are the backbone of England's sea power, just as they will be our own. For obvious reasons these particular ships by reason of their construction and slow speed will not form a naval reserve of any considerable value; they are entirely unfitted for the carriage of mails, therefore are not in the line of postal or admiralty subsidy; however, these vessels are the real essence of our strength upon the sea and should be encouraged, the system of discrimination in duties heretofore referred to, would fit their needs in a measure at least. The nation's needs do not stop here.

"We need upon the seas the swiftest ships to carry our mail, and to form an auxiliary force in time of war. We need ships of every class in which to instruct seamen for our increasing navy. Other nations have this sea equipment, and unless we are willing to forego the accruing advantages, we must have it also. A discrimination in duties will not be sufficient; to gain our proper place upon the sea, we must imitate the example of other nations and provide a direct subsidy as well. By a wedding of both principles, that of discriminating in duties and direct subsidies, we shall, in my opinion, secure the best results. Each has its own field of usefulness and the formulation of a policy adapted from each would be likely to receive the support of both political parties."



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ON THE FACE OF THE EARTH.

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To point the moral in a few sentences it may be said that Great Britain has followed the policy of protection on the high seas and free trade on land while the United States has followed the policy of protection on land and free trade on the high seas. It is interesting to observe that Britain is far and away the leader in the world's carriage of products over sea while she is now engaged in a very serious attempt to alter her fiscal policy on land. On the other hand no nation in the world has enjoyed within its own boundaries such unbroken prosperity as has marked the career of the United States while no nation in the world has sunk so low in business which it transacts upon the seas. Britain has some 14,000,000 tons and over of ships engaged in foreign service while the United States has only 879,264 tons. Britain since 1860 has steadily year in and year out subsidized her shipping. Ever since steam became a commercial factor in marine propulsion she has had her eye fixed directly upon the establishment of ocean lanes to all parts of the world under governmental aid. She has never swerved a hair's breadth from this policy. Year after year she has spent something like \$6,000,000 to aid her shipping oversea. Last year she loaned \$13,000,000 to the Cunard Steamship Co. at $2\frac{3}{4}$ per cent and in addition agreed to give that company an annual subsidy

of \$750,000 for the purpose of operating two high-speed steamers between Liverpool and New York. This is in excess of an annual subsidy of \$350,000 which the Cunard Steamship Co. has been receiving for several years. It is no wonder that with such liberal aid that Britain has dotted the seas with her ships and her country with ship yards. Consider what an inducement to the establishment of yards for ship construction and ship repairing is an annual sum like that thrown into the coffers of shipping lines, a sum that is absolutely independent of the ordinary fluctuations of business. Nor are other nations much behind Britain in this respect. France has lately given even more than Britain to aid her shipping. Germany expends annually over \$2,000,000 and Japan nearly \$4,000,000, while the total sum expended altogether in the United States is \$998,000 and even that is for the specific purpose of carrying the mail from this country to Europe.

The Merchant Marine Commission which has lately made a tour of the country has been very thoroughly fortified with figures and facts concerning the state of shipping in the United States and the impediments which prevent it from attaining a natural growth. Reports show that while several members of the commission were somewhat sceptical as to the need of aid at the time of their appointment they are now unanimously of opinion that something must be done, and that immediately, if the American flag is to be prevented from disappearing from the high seas altogether. The commission is to have its report ready to present to congress on the opening day of its session, Dec. 1 next. This report will undoubtedly be awaited with great interest by all sections of the country. It embodies the last hope of the shipping interests of the United States.

The great weakness in the doctrine of prohibition lies in the fact that it does violence to human nature. It is natural to want that which one may not have. Life is made up of striving for the things one has not and of not caring much about them after one has succeeded in getting them. That is why the getting of money is the real zest and the holding of it of no particular pleasure. Man in common with all animals has a love of stimulants. He differs from the rest of the animal kingdom in that he can make his own stimulants but the appetite is common. The wise, therefore, try to regulate the product and sale of stimulants and not their prohibition for prohibition is impossible. These few observations are brought to mind by the fact that the navy department has just had to pass upon the question of christening the battleship Connecticut, which is to be launched at the New York navy yard next month, with wine. The Christian Endeavor society of Connecticut has protested against the use of this beverage. There is no doubt whatever but that this protest has been hon-

estly made but how the breaking of a bottle of wine over the prow of the battleship can possibly injure the ship or any human being is beyond ordinary understanding. The secretary has therefore denied the petition of the society.

If all roads lead to Rome, as the saying is, really all efforts to discover whether the administration purposes to take any action towards extending the coast-wise laws to the Panama canal zone lead to the bureau of navigation. All the departments praise the movement but declare that the matter rests with the bureau of navigation; and the bureau of navigation says that it will have careful consideration. That is, of course, to be expected. All important subjects should have careful consideration; but what is wanted at this time is a little action. The United States is going to build the Panama canal. It is going to expend a sum aggregating \$200,000,000 in digging a navigable channel from the Caribbean sea to the Pacific ocean. The commerce which will pass through this canal will not for many, many years begin to repay even the interest on this investment. It is only within the past two or three years that more than 10,000,000 tons have been annually passing through the Suez canal and it is to be remembered that there is this distinguishing difference between these two canals, that while Suez connects continents with their teeming millions Panama merely connects two wide oceans. If, therefore, there is any immediate profit to be expected from this enterprise it should surely go into American pockets since the American people are bearing the whole of the burden. During the next ten years an enormous quantity of materials must go forward to be used in the construction of this great ditch. The administration has already declared that supplies to this zone from the United States are to be admitted free, while the Dingley act is to apply to all goods coming from foreign countries. If goods from American ports are to be admitted to the zone free while goods from foreign ports are taxed the American shipments should be reserved, as are all other port to port American shipments, to the American ship. It seems a clearly legal thing to do and an eminently business-like one. It is predicted that if the bureau of navigation will simply rule upon this point to the advantage of the American ship the stimulating effect of such ruling will be immediately observed in the ship yards of the United States, for orders for ships for this service would undoubtedly follow.

CONDITION OF LAKE TRADE.

It cannot be said that there is any material improvement in lake trade though coal has been moving more freely during the present week than it has for some time past and the Steel Corporation reports that vessel owners are less impatient upon getting cargoes from it than they have been for some little time past. However, an incident of the week

has been the coming down of vessels from the head of the lakes light, which does not speak well for the volume of commerce moving. The Steel Corporation is managing to keep its contract tonnage employed and is carrying up coal in some of its own vessels. The ore movement is lighter this month than it was last and authorities differ as to the total amount that will be brought down this year but it is expected to be from 17,000,000 to 18,000,000 tons. A lower estimate than this is placed upon the total movement by other authorities.

CHICAGO GRAIN REPORT.

Chicago, Aug. 23.—The past week decided few, if any, fundamental changes in the grain shipping position. Vessels held under fair call with rates steady at basis 1 cent corn for Lake Erie ports, Georgian Bay, etc., about 2½ cents Ogdenburg and Kingston, and 3 cents corn all water to Montreal. Liners report fair package freight returns although the movement as yet is short of "space" requirement.

Wheat at \$1.15 per bushel reflects a condition which will hardly admit of any near effective shipping, but very fortunately the corn is under special favor and the early government estimate of 2,500,000,000 bus. crop now most promising of fulfillment in fine quality. Meantime the movement of old corn toward Chicago is abundant and some 5,000,000 bus. sales directed from country points during last week couples with improved cash inquiry east and good sales of direct export to Liverpool. The Liverpool rate basis for time figures about 5½ cents and 6 cents from Chicago, lake and rail via Montreal and New York respectively.

The shipments noted below "this week" are distributed about as follows: Via all rail lines 210,000 bus. wheat; corn 225,000 and of oats 980,000; via lake to Buffalo, etc., of wheat 112,000, 1,180,000 corn, 200,000 oats; and via lake to Canada points 105,000 bus. corn and about 300,000 bus. oats.

Lake and Rail Shipments—

	This week.	Last week.	Same week last year.
Wheat	356,212	519,801	417,420
Corn	1,567,432	2,089,500	1,907,797
Oats	1,479,517	1,107,135	1,939,188
	3,403,161	3,716,526	4,264,405
	Shipments since Jan. 1, 1904.		Same time last year.
Wheat	8,070,049		12,013,607
Corn	42,228,806		52,008,386
Oats	29,845,496		42,558,092
	81,053,441		107,480,085

Stocks of grain in elevators—

	This week.	Last week.	Same week last year.
Wheat	2,687,000	2,488,000	5,328,000
Corn	3,256,000	4,175,000	4,713,000
Oats	3,750,000	2,480,000	4,817,000
Rye	563,000	553,000	462,000
	10,265,000	9,696,000	15,320,000

The inner harbor of Milwaukee needs decided improvements. Big freighters have stuck in the mud in the channels, in some instances near docks where it was supposed there was a deep head of water. The D. M. Clemson, the Siberia of the Gilchrist fleet, and the Wolvin have each been delayed in reaching their docks many hours and had to be pulled through the accumulations of mud by tugs. Marine men of Milwaukee say that unless the government shows a disposition to speedily remedy the difficulty in the harbor the work will be done from funds which the city will raise itself.

FUTURE OF LAKE TRADE.

Buffalo, Aug. 16.—As is usual in times of depression, there is a large amount of casting about this summer among marine men to find whether the lack of business is going to be permanent or whether it is merely on account of certain conditions peculiar to this season, which are not likely to return. The general idea seems to be that both elements are at work against the vessel owner, and there is therefore a double reason for the failure of the lake fleet to make the old profit that the business has enjoyed almost uniformly for more than twenty years.

To the older vessel owner the menace of the big carrier is probably the most serious thing in sight, as he is, for the most part—outside of the lumber trade—unable to meet this sort of competition. He therefore sighs for the good old days, with coal freights close to a dollar a ton all summer, and other freights to match, with tonnage often considerably less than the demand. Nobody expects a return of such conditions till the amount of freight to move increases in proportion to the size and number of the new steel craft on the lakes, so the period of great earnings seems to be past forever.

It seems too bad that a new control of the lakes should thus step in and cast the older marine men aside, but this is a rule of trade. It has always happened at times that new blood seizes on the experience of the old and makes a new advance that the older has not cared or dared to make, and there is a new state of affairs all through. Had the vessel owner of a dozen years ago gone to building 500-ft. steel steamers he would have given no opening to the more daring new owner and would still be in control of the situation.

During the first ten days of August there were shipped from Buffalo eighty-six cargoes of hard coal. Of these there were ten that aggregated 70,416 net tons, or over 7,000 tons each. This average has never been reached before, and it means that there is not to be any further shortage of coal tonnage again till the amount to go is much larger than it is now, and so the shipper is in control of rates. A further glance at the situation will convince that the big carrier has been a necessity if the lake trade is to hold its own against the railroads. With a fair-sized fleet, of say 3,000-ton carriers, rates would now be much higher than they are and earnings would be good, but the situation would soon be controlled by the roads, and the lake trade would go where the Erie canal trade did. So while the big carrier has hurt the individual it has saved the lake trade by assuring shippers—railroad companies alike with others—that it makes no difference how much freight is offered, it will be moved promptly. The railroads will never again be able to say this. It is for a restoration of this condition from the lakes to the ocean that we are rebuilding the Erie canal.

As to the encroachment of rival routes, Canadian or all rail, there has been less heard this summer than for a long time. Indeed, it now looks as if the Welland canal route was again far on the wane, and that till some opening to the St. Lawrence from Georgian Bay is made there is little new diversion to be looked for there. Montreal boasted last season of her big receipts and showed "conclusively" that her route and rates would insure a continuation of this growth. Now she is complaining that the rail rates east of Buffalo are cutting her out of business. When the Erie canal again cuts these rates in two, what then?

Last season there was shipped from Oswego, the only hard coal port on Lake Ontario in the upper lake trade, 101,960 gross tons of hard coal. This season to Aug. 1 the amount is 26,212 tons, so it appears that the throwing off of the Welland canal tolls did not stimulate trade as it was expected to do. It is stated now that the venture made by an

upper-lake line to trade with Quebec direct has been given up. The old Canadian city is not a wide-awake port in the eyes of the Yankee shipper and vessel owner, so the lower terminus is again to be Montreal. From the same source of information it seems that the six-months' season is not much of an inspiration either.

There is less flour moving on the lakes this season than for a long time, and this state of things has alarmed millers as well as carriers. The fact is that we must soon have the wheat crop of the Canadian northwest to use, and it is quietly stated from high sources that "after election" there will be a big move made to open reciprocity negotiations with Canada looking to the throwing off of the present prohibitory tariff on wheat. All of which will please the American vessel owner.

JOHN CHAMBERLIN.

VISITED BUFFALO HARBOR.

Congressman Theodore E. Burton, chairman of the committee on rivers and harbors, accompanied by several members of the committee, visited Buffalo during the past week to ascertain the needs of the harbor. A trip was made up the river and in the outer harbor under escort of Capt. J. J. H. Brown, Theodore S. Fassett, John W. Robinson and other public men in the government yacht General Wilson. In an interview Mr. Burton stated that the river and harbor bill will be introduced in the next session of congress notwithstanding the fact that it is the short session. Last year no bill was offered because \$10,000,000 had already been appropriated for work under way and it seemed undesirable to bring in another bill until those projects were nearer completion.

"It should always be borne in mind," said Mr. Burton, "by those desiring river and harbor improvements that the interests of specific localities can be best observed by advocating a liberal policy in the making of river and harbor improvements. When congress decides to increase its expenditure for this purpose deserving improvements will be taken care of. It may be found necessary to adopt a policy under which cities and communities immediately benefited shall contribute a part of the money for the improvements. This would insure the exclusion of undeserving projects and make it possible to secure results more promptly."

Mr. Burton has had this plan in mind for some time but admits that the establishment of methods that would be just to all parties would involve an immense amount of detail which would be almost beyond the scope of legislative action. Mr. Burton had nothing definite to say concerning the improvement of Black Rock harbor.

CARGO RECORDS TO DATE.

The loading record of the Wolvin, consisting of putting on board her 10,245 gross tons in 1 hour, 30 minutes, including shifts, was made at the Allouez bay dock at Superior, Wis. Superior has resented the fact that the newspapers gave credit to Duluth for this performance. There has been no change in the cargo record during the past two weeks with the exception that the steamer D. M. Clemson of the Provident Steamship Co.'s fleet takes third place in the coal cargo records. Following are the records to date:

Iron Ore—Steamer Augustus B. Wolvin, owned by Acme Steamship Co., A. B. Wolvin, Duluth, manager, 10,245 gross tons or 11,474 net tons, Superior, Wis., to Erie, Pa.; steamer Augustus B. Wolvin, owned by Acme Steamship Co., A. B. Wolvin, Duluth, manager, 10,973 gross tons or 12,285 net tons, Escanaba to South Chicago; steamer Wm. Edenborn, owned by Pittsburg Steamship Co., Harry Coulby, Cleveland, manager, 8,807 gross tons or 9,864 net tons, Escanaba to South Chicago; steamer Sahara, owned by Globe Steamship Co., G. A. Tomlinson, Duluth, manager, 8,737 gross tons or 9,785 net tons, Duluth to Conneaut.

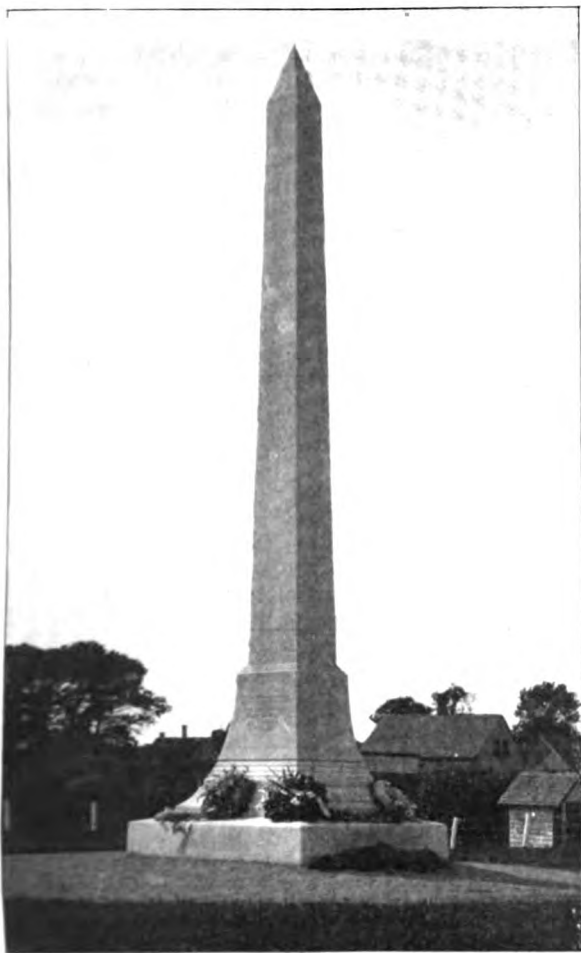
Grain—Steamers J. H. Reed and D. G. Kerr, Provident

Steamship Co., A. B. Wolvin of Duluth, manager, 275,000 bu. of wheat each, equal to 8,250 tons (2,000 lbs.), Duluth to Buffalo; steamer D. M. Clemson, Provident Steamship Co., A. B. Wolvin, Duluth, manager, 336,365 bu. of barley, equal to 8,073 tons, Duluth to Buffalo; steamer Rensselaer, Pittsburgh Steamship Co., Harry Coulby, Cleveland, manager, 151,000 bu. of wheat, 94,000 bu. barley and 55,155 bu. of oats (300,155 bu. in all), equal to 7,668 tons, Chicago to Buffalo; steamer Mataafa, Pittsburg Steamship Co., Harry Coulby, Cleveland, manager, 185,399 bu. of corn, 40,000 bu. of rye and 43,600 bu. of wheat (268,000 bu. in all), equal to 7,619 tons, Chicago to Buffalo.

Coal—Steamer Augustus B. Wolvin, owned by Acme Steamship Co., A. B. Wolvin, Duluth, manager, 10,569 net tons of anthracite, Buffalo to Milwaukee; steamer Augustus B. Wolvin, owned by Acme Steamship Co., A. B. Wolvin, Duluth, manager, 9,904 tons, 1,800 lbs. of bituminous, Lorain to Duluth; steamer Sahara, owned by Globe Steamship Co., G. A. Tomlinson, Duluth, manager, 8,906 tons, 200 lbs. soft coal, Lorain to Duluth; steamer D. M. Clemson, owned by Provident Steamship Co., A. B. Wolvin, Duluth, manager, 8,441 tons, 1,700 lbs. of soft coal, Toledo to Duluth.

MONUMENT TO WM. H. MACK.

The accompanying photograph shows the monument which has been erected near Chatham light, Chatham, Mass., by



MONUMENT TO WILLIAM H. MACK.

Mrs. Margaret Mack of Cleveland in memory of her son, William H. Mack, who was lost off the Monomoy, March 17, 1902. The life-saving crew which attempted to rescue him was also lost and their heroic attempt is commemorated in the monument. The shaft stands 35 ft. high and overlooks the

Atlantic. The name W. H. Mack is in raised letters on the front and on one side are inscribed the names of the members of the lost Monomoy crew and also the names of the crew of the ill-fated barge Wadena.

AROUND THE GREAT LAKES.

A libel against the schooner Donaldson for a seaman's wages has been filed in the United States district court at Detroit.

The schooner Grampian, being towed down the river at Cleveland on Aug. 19, had her mizzen top mast carried away by the Superior street viaduct.

The schooner Mongaugon arrived at Detroit Aug. 20 with but one spar, the other having been broken off close to the deck in a storm on Lake Erie.

The Great Lakes Engineering Works has filed a libel in the United States district court against the steamer Huron City for \$617.40 which it is claimed is due for repairs.

On Aug. 20 the schooner Mystic arrived at Tonawanda with the biggest cargo of lumber taken to that port this season. The Mystic had on board 1,300,000 ft. for A. A. Bellinger.

Secretary H. E. Reynolds of the Lumber Carriers' Association has just issued a report in which he states that seventy-five association boats have been withdrawn from the lumber trade.

The propeller Neshoto of the Gilchrist fleet went ashore, Aug. 20, 25 miles north of the Southeast shoal, Lake Erie. The stranded vessel is in bad shape with her hull half full of water.

H. T. Wicks, a foundryman of Saginaw, has had constructed at the Craig Ship Building Co.'s yards at Toledo a yacht which will be launched next week. The new craft is to cost \$60,000.

The steamer S. N. Parent of the Great Lakes & St. Lawrence Transportation Co. is now at dry dock at the plant of the Buffalo Dry Dock Co. Extensive repairs will be necessary to put her in shape.

The propeller W. H. Mack, while entering the South Chicago harbor Aug. 19 with a cargo of ore, got out of the channel and stranded on Rockefeller shoal, the name given the mud bank at the harbor entrance.

The steamer Prentice, when off Point Abino, 11 miles from Buffalo, lost her barges, the Halsted and Middlesex, on Aug. 20. She reported the loss of the vessels and tugs were sent after them and towed them to Buffalo.

The schooner Penobscot, while lying alongside the break-wall at Buffalo on Aug. 22, sprang a leak and was towed to shelter. Temporary repairs were made and the boat proceeded to Tonawanda with her 60,000 ft. of lumber.

The propeller Colonial, bound down from Harbor Beach, Buffalo, on Aug. 20, suffered so badly in a storm on Lake Huron that the captain ran her on a mud bank to pump out the water. The schooner Unadilla also lost a deckload of coal.

The Canadian schooner Zephie, lumber laden from Little Current, narrowly escaped from foundering in Lake Huron on Aug. 19. The boat reached the shelter of Tawas Point where she lay with 5 ft. of water in her hold when the wrecking tug reached her.

The Sandusky Fish Co. through its receiver, Cornelius Nielsen, has sold the steamer Ogontz to J. O. Pickands of Munising, Mich., for \$3,500. The Ogontz will be fitted out as an excursion passenger steamer to run from Munising to Grand Island.

The work of cofferdamming the steamer City of Berlin has begun under the direction of Capt. Harris W. Baker. A cargo of 45,000 ft. of lumber has been taken to the island to build the cofferdam. When it is complete the boat can be pumped out in a day.

Capt. John Perew, on behalf of the underwriters, is making

a survey at Detroit of the Gilchrist steamer Neptune, which grounded on Bar Point Sunday evening. It was necessary to lighter 400 tons of coal before she could be released. One compartment of her water bottom is full of water.

Government dredging in maintaining the harbors at Toledo, Cleveland and Conneaut will after Sept. 1 be done by the big dredge Burton, which is en route from Norfolk to Toledo. The machine, which is the first on the lakes of the self-propelling and sea-going type, will be commanded by Capt. Stevenson of Toledo.

The steamer Weston is at the dock of the Detroit Ship Building Co. with its stern badly damaged. The boat made an entire trip with the bottom bracket of the bearing missing but her master was not aware of the fact until Diver John Woods made an examination. It is supposed that the boat picked up a log in her wheel.

Dullness in marine circles is marked strongly by the boats trading out of Chicago not having the usual quantity of old rope and other worn-out boat equipment for sale. In former seasons the junk dealers seem to have been legion, but this season the steamers and schooners have not had enough work to wear out anything on them.

Capt. James W. Morgan of the Steel Corporation steamer Coralia reported Aug. 21 that the Canadian gas buoy at Bar Point on the east side and outer end of the channel, marking the turning point down the lake, has been dragged out of place and turned over and now lies bottom side up. This probably accounts for the grounding of the Neptune.

During the first half of this month the car ferries of the Pere Marquette Steamship Co. have taken out of Milwaukee 1,577,000 ft. of lumber for eastern points, according to figures at the Milwaukee customs office. Last month 2,605,000 ft. were taken out for points across the lake, and it is probable that this month's shipments will exceed those of last.

The Gilchrist steamer Neptune went aground on Bar Point, Lake Erie, on Aug. 21. She has a hole in her bottom and her forward starboard compartment is full of water. The steamer Vulcan, which stripped her wheel in the river at Lorain and was being towed up by the steamer Weeks, is out 2½ ft. on Grosse Point, Lake St. Clair; she is also a Gilchrist boat.

While the crew of the steamer A. G. Lindsay were eating breakfast in the cabin near the stern of the steamer this week the steel prow of the steamer J. J. Albright penetrated the stern within a few feet of the table. It appears that the Albright in entering the harbor failed to stop at her dock and plunged into the stern of the Lindsay which was loading at the adjoining dock.

The final effort to realize something out of the Toronto roller steamboat by converting her into a sort of whaleback may prove futile. Lloyd's register authority is not prepared to give her a rating, as she appears to be so thin plated and so poorly riveted that she probably cannot stand ordinary demands upon her. She was built a perfect cylinder, so it was held that she did not need to be very heavy.

Congressman Burton, chairman of the committee on rivers and harbors, has declared that an all-American channel at the mouth of the Detroit river would be a waste of money. He states that he was never in favor of an all-American channel, saying that the idea that American ships would be destroyed in case of war with Canada is preposterous. He does not think that there is any danger of war with Canada and that sentiment should not be permitted to interfere with business.

The Richelieu & Ontario Navigation Co. has begun action against the firm of Gagnon & Freres of Quebec for the sum of \$1,000 to restrain the firm from interfering with what the latter company had already done towards the raising of the steamer Canada, lying on the bed of the St. Lawrence river near Sorel. A counter action has been taken by Gagnon & Freres for \$5,000 damages. The Richelieu & Ontario Naviga-

tion Co. is going ahead with the raising of the steamer themselves.

After a review of the case government officials have decided to reduce the fine imposed upon Capt. Calvin Chamberlain of the steamer Umbria, for failure to answer signals, from \$200 to \$50. The Umbria was going into Duluth on July 30 with a cargo of coal just as the Neosho of the Gilchrist fleet was approaching the canal outward bound. The Neosho signalled that she would pass to port of the incoming vessel but Capt. Chamberlain failed to reply to the warning. Collector Willcuts happened to be at the dock at the time and imposed the penalty.

Lieut. Col. Davis, government engineer at Detroit, draws attention to the site occupied by the burned steamer Minnesota near Grand point, St. Clair river. This has been found a menace to navigation by the United States engineering department as there is only 18½ ft. of clear water about the spot. It is in Canadian waters and Col. Davis will take the matter up with the Canadian government. The obstruction lies diagonally on the same line with Russel island range lights Nos. 10 and 11, opposite the Porter White farm, and about 1,500 ft. below Grand point. Navigators of big ships should exercise the utmost caution in passing the point.

NEW PASSENGER STEAMER FOR ANCHOR LINE.

The American Ship Building Co. has closed contract with the Anchor Line for a passenger and freight steamer to be a duplicate of the famous Tionesta. The new steamer will be built at Cleveland and is promised for delivery May 1 of next year. While her general dimensions and leading features will be the same as the Tionesta she will have several improvements over that splendid craft. She will be 360 ft. over all, 340 ft. keel, 45 ft. beam and 28 ft. molded depth. Her engines will be quadruple-expansion with cylinders 22, 31½, 45 and 65 in. diameters by stroke of 42 in. Steam will be supplied by four Scotch boilers 12½ ft. in diameter and 11½ ft. long, allowed a pressure of 210 lbs. and fitted with Howden draft. The steamer's guaranteed speed will be 16 miles. With this addition the Anchor Line will have five passenger steamers on its route between Buffalo and Duluth next year.

STAGES OF WATER.

The gage records of the United States lake survey show the following mean stages of water above mean sea level, for July, 1904:

	Stages during July. Feet.	Higher Lower		Higher Lower	
		than during same month last year.		than during July, 1895.	
		Feet.	Feet.	Feet.	Feet.
Lake Superior.....	602.91	.....	0.23	0.01	.....
Lake Michigan.....	581.38	0.59	.....	1.31	.....
Lake Huron.....	581.57	0.82	.....	1.41	.....
Lake Erie.....	573.19	0.21	.....	1.73	.....
Lake Ontario.....	248.05	1.36	.....	3.52	.....

Present fall Lake Huron to Lake Erie, 0.61 ft. more than a year ago.

The freight steamer Mohican built for the Clyde Steamship Co., was launched at Cramps last Saturday. The vessel was christened by Mildred L. Rose, grand-daughter of the late Wm. Cramp. The Mohican will ply between Boston, New York, Charleston and Jacksonville, Fla. She represents the highest type of modern construction.

Relief lightship No. 58, on Pollock Rip lightship station, Boston, was run into by the steamer H. M. Whitney and was cut through on her bow to deck planks. The damage is quite serious.

SHIPPING OF CANADA.

The department of marine and fisheries of the Dominion government has just issued its shipping list for 1903. The total number of ships registered in Canada on Dec. 31 last was 7,020 of 683,147 tons. Estimating their value at \$30 a ton the total capital represented is \$20,494,000. During the past three years both the tonnage and the number of vessels registered in Canada has been increasing, whereas before 1900 there had been a steady decline for several years, as the following record since 1874 will show:

	Ships.	Tonnage.
1874	6,030	1,158,363
1875	6,952	1,205,565
1876	7,192	1,260,803
1877	7,362	1,310,468
1878	7,169	1,333,015
1879	7,471	1,332,094
1880	7,377	1,311,218
1881	7,394	1,310,896
1882	7,312	1,260,777
1883	7,375	1,276,440
1884	7,255	1,253,747
1885	7,315	1,231,856
1886	7,293	1,217,766
1887	7,178	1,130,397
1888	7,142	1,089,642
1889	7,152	1,040,481
1890	6,991	1,024,974
1891	7,015	1,005,475
1892	7,007	964,129
1893	7,113	912,539
1894	7,245	869,624
1895	7,262	825,776
1896	7,279	780,299
1897	6,684	731,754
1898	6,434	693,782
1899	6,698	679,352
1900	6,735	659,534
1901	6,792	664,483
1902	6,836	652,613
1903	7,020	683,147

Last year the provinces were credited with new shipping as follows:

	Number.	Tonnage.
Nova Scotia	135	12,907
Ontario	71	10,719
New Brunswick	24	1,708
Quebec	31	1,076
British Columbia	59	3,494
Prince Edward Island	6	171
Manitoba	5	248

The provinces chiefly affected by the decline of shipping since 1878 are New Brunswick and Nova Scotia. In 1878 New Brunswick ports were credited with 1,142 vessels of 335,205 tons; last year they had bought 929 vessels of 59,508 tons. In 1879 Nova Scotia had 2,975 vessels of 552,159 tons; last year it had 2,000 vessels of only 216,053 tons. Ports which formerly figured largely in the register of new shipping have ceased to build altogether. The cause of this is the replacement of wood by steel as a ship building material. Ship building in Canada declined when steel became the accepted material for ship construction. Nor will Canada regain a considerable place in ship construction until she is able to employ steel. In point of fact the gain during the past three years was due to the steel ships that have been built for Canadian lake service by the plants on Lake Ontario.

OBITUARY.

Rear Admiral E. M. Shephard, United States navy, retired, died last week at Jaffrey, N. H. He was born in New York and was appointed to the naval academy in 1859. Admiral Shephard served through the civil war and later commanded the Kearsarge, the Mohican, the Minnesota and the San Francisco. He became a rear admiral in 1901 and shortly afterwards retired upon his own application.

David J. Matlack who had been for fifty-five years superintendent of the iron foundry of Cramp's ship yard of Philadelphia, died very suddenly on July 25 at his home in Longhorne, Pa., of heart disease. Singular to relate on the day of his death Mr. Matlack had succeeded in casting the largest turbine wheel ever made, a wheel capable of developing 12,500 H. P. Mr. Matlack was a member of the American Society of Mechanical Engineers. He was seventy-three years old.

Edward Luckenbach, sixty years old, who died last week at his home in Brooklyn, N. Y., was the largest individual tug boat and barge owner on the Atlantic coast. He went to New York from Rondout with one canal boat and went into the towing business later and within the last fifteen years built the most powerful and swiftest ocean-going tugs in the country. He also owned several steamships including the J. L. Luckenbach, formerly the North German liner Saale, partly burned at the great Hoboken pier fire. One of his purchases was the steamship Buena Ventura, a prize of the Spanish-American war which he recently converted into a coal barge.

ITEMS OF GENERAL INTEREST.

The battleship Nebraska, building by Moran Bros., Seattle, Wash., will be launched in October.

The new marine railway in the yard of the Portland Shipbuilding Co., Portland, Me., is attracting much attention.

The excursion steamer Valley Girl of the Starin Line, New York, has been condemned by steamboat inspectors.

Capt. Ed. Brandow is having a tug built by A. C. Brown & Son, the wooden shipbuilders, Tottenville, Staten Island.

Capt. J. G. Emmons was re-elected secretary of the New York Harbor Towboat Co. at the annual meeting of the corporation.

The Weems Steamboat Co. denies that anything has been done in the sale of the line to the Pennsylvania railroad as reported in the newspapers.

The International Mercantile Marine Co., better known as the shipping combination, has cut its steerage rates from Liverpool to Boston to \$8.75.

Willard P. Voorhees, receiver of the Perth Amboy Ship Building & Engineering Co., has leased the plant at Perth Amboy, N. J., to Lewis Nixon.

In September James W. Elwell & Co., 17 State street, New York, will have a line of freight steamers running between New York and Savannah.

A new steamer is being built to take the place of the Alice, of the New Orleans and Amite river line, which was burned recently. The new boat is being constructed in Madisonville, La.

After four years of investigation, the boiler committee appointed by the British admiralty have unanimously declared that water-tube boilers are more suitable for naval purposes than cylindrical and highly indorse the Babcock & Wilcox type.

Jeebi, designed by Thomas Clapham, Roslyn, Long Island, N. Y., has won eleven races straight so far this year in the 21-ft. open jib and main sail class. This last race was won in the regatta of the Horseshoe Harbor Yacht Club. The other races won by this remarkable little vessel were recorded in the Review of August 11.

Experimental Tank for Research Work on Ship Propulsion.*

BY SIR WILLIAM H. WHITE,

Vice President of the Institution of Naval Architects.

At the request of the council, I have undertaken to submit to the members of the Institution a proposal for the establishment of a national experimental tank, to be chiefly devoted to research work in connection with fluid resistance and ship propulsion.

Having been intimately connected with the work of the admiralty experimental tank for more than thirty years, from the time of its establishment by the late Mr. W. Froude, and having also full information as regards the nature of the work which has been done at the experimental tank established by Messrs. Denny about twenty years ago, and the similar establishments founded by Dr. Tideman in Holland, by the Russian government at St. Petersburg, by the Italian government at Spezia, and the United States government at Washington, as well as knowing generally what has been done by the tanks established at later dates in Germany, and what has been done or is now contemplated in France, I am in full agreement with the view that it is not wise to contemplate the establishment of a single tank in any locality to be available for the testing of ship models in connection with designs.

The inevitable consequence of a fuller recognition of the value of these tanks, as adjuncts to the designing departments of ship yards, must be the establishment by each of the great firms of its own experimental tank. Messrs. Denny set the example twenty years ago. Messrs. Brown have lately done the same thing on a magnificent scale at Clydebank. Mr. Parsons, at an earlier date and in a simpler form, devised and carried out most ingenious arrangements for testing resistances of models of his turbine-propelled vessels. What these firms have done is what will almost certainly be done on a larger scale in the immediate future. There are openings no doubt, and it is surprising to me that they have not as yet been availed of, for the creation in or near ship building centers of experimental tanks, possibly of less elaborate and costly nature, under the control of gentlemen of ability and high character; whereat models may be tested of ships proposed to be built by firms—not of the first rank, and whose needs in regard to novelties of form or propulsion are only occasional. Even in ordinary practice cases occur where ship builders have to face new or critical conditions, and where model experiments would be of the greatest assistance.

It is the fashion, I know, to treat the design of cargo steamers as a department of ship building where only precedent and experience are of importance, but those concerned with that branch of construction realize how often, when difficult problems are propounded and there is little choice in the selection of some or all of the principal dimensions, they would be glad to turn to authentic experiments on resistance, and so to eliminate some of the features in designs which now have to be dealt with as best they may, without scientific guidance based on experiment. Many builders of small craft also, whose establishments could hardly bear the burden of an experimental tank, would be glad to patronize such experimental establishments to have been indicated.

Having said this, may I add an expression of my profound conviction that, if the ship builders, marine engineers, and ship owners of this country are well advised, and desire to further to the utmost the maintenance of our supreme position in mercantile ship construction, they will not be slow in responding to the appeal which is now made, and in providing the funds necessary for the establishment and maintenance, in connection with the National Physical Laboratory, of a tank avowedly devoted to research work on the general principles of fluid resistance, the efficiency of propellers, and oth-

*Paper prepared for Institution of Naval Architects.

er matters greatly influencing economy of propulsion. Generosity in this instance will undoubtedly result in a rich reward.

The questions which might be dealt with in such an establishment are of universal interest to all classes connected with shipping. Ship builders and marine engineers, no doubt, would thus derive much benefit; but the greatest gains would be realized by ship owners, whose working expenses would be minimized by improvements resulting from experimental investigations, conducing to lessened resistance or greater propulsive efficiency. Moreover, in the competition with foreign designers, which grows more and more keen as their experience is enlarged, we cannot afford to throw away any aid to excellence in design, and must apply scientific methods to the fullest possible extent. It is a suggestive fact that a great shipping corporation like the North German Lloyd have thought it worth while to establish and maintain an experimental tank at Bremerhaven, and it is within my knowledge that very substantial improvements have been made in connection with the designs of their ships as the result of investigations there carried out.

No doubt, as the number of experimental tanks belonging to private firms is increased, the testing of methodic series of models (representing variations in form on certain principal dimensions, or alternative dimensions and proportions on given displacements), inquiries into the efficiency of propellers, investigations of frictional resistance with different natures of surface, and other matters more or less belonging to general research, will be dealt with more exhaustively than has hitherto been possible. On the other hand, those of us who have watched the working of these establishments for many years know that if they are engaged, as they must be to a very great extent, in testing models for current designs—involving the trial of a number of alternative forms or different propellers—such great demands are made upon the time and working capability of the staff that it is most difficult to carry to completion any elaborate investigation. More or less serious interruptions growing out of pressing demands continually occur. The attention of the staff is frequently diverted from problems incidental to original research, involving close observation and thorough analysis, and, in this way, the results obtained are much less satisfactory, while the investigations are more prolonged. In not a few instances special apparatus has to be devised and installed for the conduct of experiments on special subjects; and sometimes it has to be dismantled, to a certain extent, in order to permit ordinary model experiments of a pressing nature to go forward.

Mr. R. E. Froude can tell us how greatly unavoidable interruptions of this nature have interfered with methodic researches on ship forms and screw propellers, which were initiated by his father, and which have been continued and greatly developed by himself during the long period that he has so ably directed the admiralty experimental establishment at Haslar. The enormous development in the fleet in recent years and the great variety of designs of ever-increasing speed and size, have resulted in the practical absorption of the experimental staff in the current work incidental to the designs for his majesty's ships. Indeed, since the death of Mr. W. Froude, when the experimental establishment was transferred to Haslar from Torquay, it has become an integral part of the constructive department of the admiralty; and it was my duty as director of naval construction to consider its most effective organization on that basis.

Mr. William Froude proposed his system of model experiments in 1868, in connection with the report of a committee appointed by the British Association, and his experimental tank

at Torquay was established in 1871. About fourteen years later this tank was closed, and the admiralty tank at Haslar was established, Mr. R. E. Froude being the superintendent. Dr. Tideman, in Holland, was one of the first to follow this lead; and in this country Messrs. Denny, at the suggestion of my friend, the late Mr. William Denny, took similar action about 1882. The Italian ministry of marine established a tank at Spezia in 1890, and the Russian admiralty, about the same time, established a tank at St. Petersburg. Subsequently, similar experimental establishments have been created at Washington by the United States navy department, in Bremerhaven by the North German Lloyd, and at the Technical high school at Charlottenburg under the Imperial German navy. The French ministry of marine has had an experimental establishment at Brest for about twenty-five years on somewhat different lines, and are now commencing a tank on the Froude system in Paris. M. Bertin informs me that it will be chiefly engaged on model experiments for warship designs. In Japan, on the initiative of Professor Purvis, the erection of a tank is being considered.

All these government tanks are almost exclusively employed in testing models for warships. In the United States and Italy arrangements are made for testing models for private ship builders at certain rates of payment, and work of this nature is done to a limited extent. At Haslar, occasional experiments have been made on mercantile models, when they have represented ships in which the admiralty were directly interested, because of their possible use as mercantile auxiliaries, or for other purposes. As a rule, however, for many years past, the pressure in connection with warship designs has been too great to permit much to be done in this direction.

As to purely research work, much has been done at Torquay and Haslar, numerous papers published in our Transactions affording evidence of the valuable results obtained; but neither staff, appliances, nor time permit of much being done. At Dumbarton many special problems have been dealt with, and Messrs. Denny have expressed their high appreciation of the benefits resulting to the designs of special classes of ships. At Spezia Colonel Rota and other Italian officers have done similar work. Colonel Rota has communicated to this institution an important research on the influence of depth of water on resistance of ships, and in a valuable book has compiled a great mass of experimental facts. Naval Constructor Taylor, who ably directs the Washington tank, informs me that as yet he has been so fully occupied with ship-model experiments that it has been impossible to devote much time to research. In Germany something similar has been done. Professor Reidler informs me that at Charlottenburg the tank will be chiefly used for model experiments connected with the design of warships, or for investigation in connection with inland navigation. Use will also be made of it for the instruction of students.

From this brief summary of facts it will be seen that the great practical value of the Froude system of model experiments is now universally admitted, and, if space permitted, numerous examples might be given of the economies that have thus been effected. It will also be obvious that in this country there is a great need for an experimental tank specially devoted to research.

It may be well for me to outline briefly the general nature of the research work which might be advantageously devolved to the experimental tank of which I advocate the immediate establishment, on a scale which shall secure not merely its complete efficiency, but its capacity for dealing with new problems which already loom on the horizon of ship building practice, and of others which must undoubtedly arise.

First: Exact information, in a shape which would be of service in the selection of the forms of ships most suitable to existing conditions, is greatly needed by naval architects. Much has been done in this direction at the admiralty tank, and, no doubt, Messrs. Denny have also investigated the mat-

ter; but, for general practice, this information is not available as yet, and, I believe, it still requires considerable extension and systematic arrangement and classification.

As instances of my meaning I may refer to cases which commonly occur where a designer wishes to approximate rapidly to the variations in resistance and engine power which would result from variations in the co-efficient of fineness, the principal dimensions of the ship remaining practically unaltered. In other cases, it is required to know how resistance will be influenced by changes in the longitudinal position of the centre of buoyancy, which become necessary in connection with alterations in the distribution of weights and the attainment of a desired trim. In still other cases, it may be desired to vary the beam, or the draught, while keeping practically to the same curve of transverse sections; or it may be necessary, in connection with the attainment of a desired "stiffness," to increase the beam and fine the ends, or vice versa. These, and many other problems which arise in practical ship designs, would be dealt with in a much more rapid and certain manner if the results of methodic series of model experiments were available for general use. There could be no possible objection to the publication of such information, which would be of a general character, and in no sense related to particular designs or infringing confidential conditions.

Secondly: Frictional resistance seems still to require fuller investigation. Experiments made in the admiralty tank, and by other investigators, are of great value; and the classic researches of the late Mr. W. Froude still furnish the best information we have on the subject. Personally, I am convinced, however, that, in connection with the interpretation of model experiments and their application to full-sized ships, it is in the highest degree desirable that still further experiments should be made; and particularly that a closer test should be applied to the comparison of the actual frictional resistance of shipshaped forms and of plane areas of equal length. On previous occasions I have expressed the opinion that while our knowledge of this frictional factor of resistance may be roughly adequate to ordinary requirements, it is by no means complete; and that, in connection with the performances of vessels of exceptionally high speed in relation to their dimensions, our present approximations to the "co-efficients of propulsions" are open to question, because of possible inaccuracy in estimates of frictional resistance. Again, recent experience with actual ships, and tank experiments on plates, indicate the great practical importance of more complete information in regard to the frictional resistances of different kinds of composition applied to the bottoms of steel ships. Mr. Holzapfel, in his paper on the subject of compositions to be read during the present session of the institution, refers to this matter, and ship owners have a deep interest in this subject, seeing that apparently small differences of condition in the surfaces of the bottoms of ships—even when clean and free from fouling—may, and do, involve very serious increase in the expenditure of power and coal, and so affect working expenses.

Thirdly: There is a consensus of opinion that only experimental investigation can enable the question of the efficiency and design of screw propellers to be dealt with in a satisfactory manner. Here again recent experience in ships of high speed and new types has given illustrations of a most remarkable nature of the economies or waste of power which may be involved in the use of unsuitable propellers. This experience is not limited, by any means, to warships, or to admiralty practice, although these are the cases which attract most public attention, and for which the facts are available. Probably no class of vessel has given more striking illustrations of what may be done by changes and improvements in screw propellers than the vessels of the torpedo flotilla: gunboats, destroyers and torpedo boats. In all of these cases there have been numberless instances where great economies in power and large advances in speed have resulted simply from changes in the forms or

areas of the blades of screw propellers. In the Drake and County classes of cruisers in the royal navy we have recent and notable examples of the same fact. It is well known that in both these cases, by simple increase in blade area, while practically maintaining the same diameter and pitch, great economy in power has been secured at the highest speeds; and that, with the same maximum development of power, an increase in speed of three-fourths of a knot to a knot has been obtained. In the Drake class the alteration of propeller blades raised the speed from twenty-three to twenty-four knots. It is within my knowledge, although I am not free to give details of facts which have been stated to me in confidence, that equally striking economies have been realized in merchant steamers, respecting which I have been asked to advise when difficulties have occurred. It may, of course, be said that there is little hope of model experiments of screw propellers giving information of practical value in a quantitative form; seeing that, in admiralty practice, screws, which had to be changed were selected on the basis of model experiments. This, however, is a very incomplete statement of the case. No doubt, up to the present time, the most valuable information obtained from model experiments with screw propellers has had relation to the influence of diameter and pitch ratio upon efficiency. The question of blade area has not been so satisfactorily dealt with. Indeed, it can hardly be expected that it should be so dealt with, when the model screws used for experimental purposes are on so small a scale, and the behavior of these models, in relation to frictional, edge and eddy resistance, are almost unavoidably affected to a serious extent by the smallness of scale. The correct deduction from the unsatisfactory experience, obviously, is not that experiments on model propellers should be abandoned, but that experiments on a larger scale should be carried out in a systematic fashion, and arrangements made with the assistance of ship builders and ship owners for the comparison of these amended and extended model experiments with actual performances of ships fitted with similar screws. There can be no question that, in this manner, enormous economies benefiting ship owners are to be obtained; but apart from systematic experiments and comparisons of results in models with those of full scale propellers, such economies will hardly be realizable.

Another section of inquiry which presses for thorough investigation, more particularly in view of the introduction of turbo-motors running at high speeds, is the relative efficiency to be obtained with multiple propellers—probably triple or quadruple—in the immediate future. Members of the institution will be familiar with the beautiful experimental inquiry which Mr. Charles Parsons conducted in connection with the Turbinia, on which he based the final arrangements of shafting and propellers which gave to that remarkable vessel an unprecedented speed and very considerable economy of power. This is only an object lesson of what must be done, if, in the step onward in complexity of propeller arrangements essential to the application of quicker running rotary engines, it is desired to secure the greatest possible economy. It may happen that the results obtained from the model experiments will not be complete or absolutely representative of the condition of the full-scale performance. On the other hand, it is absolutely certain that, by means of model experiments, many important particulars can be determined and designs for ships can be prepared with much greater certainty of success. Experience with the earlier vessels fitted on the new system will, no doubt, suggest further improvements in later vessels, just as has happened with both single and twin screws in the past. In this connection, too, the important subjects of the best shape for the stern, the best arrangements of supports for shafting (either by bossing or by brackets), the most suitable relative positions for adjacent propellers (both longitudinally and transversely), and other matters of importance, can be investigated at comparatively small cost, instead of having to

make costly trials in actual ships and possibly to carry out alterations at very great cost in order to obtain improved performance. In this connection it may be interesting to say that Messrs. Denny inform me that they have derived the greatest benefit in their designs for paddle steamers of exceptional speed, and in designs for the turbine steamers built by the firm from experiments made in their tank.

Fourthly: The question of air resistance is becoming increasingly important, especially in passenger steamships with enormous superstructures and with multiplied shelter-decks. The late Mr. Froude made use of the Torquay tank fully a quarter of a century ago to determine air resistance, and permitted me to embody the valuable results obtained in the earliest editions of my "Naval Architecture." Since that time similar experiments have been made in other tanks, and there can be no doubt that, with increase of speed, the question must receive more attention than it has hitherto done in connection with the designs of ships.

Fifthly: The influence of depth of water upon the resistance of ships is also becoming more and more important as speeds are increased. Here, again Mr. William Froude led the way, by experiments on models, in obtaining definite information. Colonel Rota, who was so long the director of the Italian tank at Spezia has contributed to the Transactions a most valuable paper, giving important results on the same subject, and, in other experimental tanks, similar investigations have been made. Recent experience in connection with torpedo-boat destroyers has directed attention once more to the subject, and here is a field where there is room for much more complete investigation, such as could be well made at the proposed establishment, and might be conducted on lines which would admit of direct comparison with trial results for actual vessels. Captain Rasmussen, of the Danish navy, has contributed to the Transactions the results of some important trials of this nature made for the Danish navy; and I have full confidence that the builders of destroyers and other fast vessels in this country would willingly associate themselves in the effort to add to our information by the comparison of the results of actual trials with model experiments.

Sixthly: There is a need for more thorough investigation of all questions relating to the manœuvring powers of ships, either under the action of their rudders or of their propellers. Here, again, is a field for which model experiments are peculiarly adapted, because in the trials of actual ships the results are often confused by adventitious circumstances, some of which may escape observation or record. To this matter, as is well known, I have for many years given close personal attention, and so far as opportunities have offered, the admiralty tank has been used for experiments intended to clear up obscure points on this important subject. It still remains true, however, that we are lacking in accurate and complete information as to the fluid pressures on rudders attached to the sterns of ships of different forms with different arrangements of propellers. In our estimates of the power of steering engines, or of the effect of rudders of different areas and forms, we are consequently proceeding on more or less empirical methods. It is important that this unsatisfactory condition of things should be amended; and it is peculiarly a section of inquiry which could be dealt with at the national physical laboratory, seeing that it is applicable to all classes of ships and involves only general principles. In this connection I may refer to a very interesting investigation made some time ago in the admiralty tank, on the influence of inward or outward turning of twin screws on the manœuvring power of ships when turning on their centre, practically without headway, one of the screws being reversed. It is unnecessary to enter into details of the results further than to state that it was conclusively shown by these model experiments, and has been independently confirmed by trials in many ships, that by suitably adjusting the relative rates of revolution of the pro-

pellers so that "stern-way" should be prevented, ships with inward turning screws could be kept as well under command as ships with outward-turning screws. It was very obvious that in many cases where difficulty had arisen in ships with inward turning screws, the revolutions given to the reversed propeller had been such as to produce sternway, although had they been outward-turning screws, the same revolutions would not have had that effect. Here was a case in which a problem which, when attacked on the full scale in actual ships, was very difficult of solution, could be completely solved by means of model experiments conducted in a tank, where automatic records could be taken of the movements of models at each instant from the commencement of the experiments. It may be proper to add that this subject has since been investigated in Italy, and a very valuable paper on the subject has been published by Captain Pecoraro.

Seventhly.—Experimental tanks furnish the only satisfactory method of dealing at moderate expense with novel proposals for radical changes in the forms of ships. With models such investigations can be made in a manner that is practically conclusive. One classical example of this is to be found in the late Mr. William Froude's report on the Ramus form for ships, proposed by a gentleman of that name, and asserted to be peculiarly adapted for economical propulsion at very high speeds. During the last thirty years the admiralty tank has been used for many such investigations for novel forms of ships or for propellers of new patterns. The popular idea is that the officials of the admiralty are averse to the consideration or adoption of novel inventions. As a matter of fact, all schemes which contain elements of promise are not merely considered, but frequently subjected to experiment. Here again other tanks have been used for similar purposes.

Eighthly.—Special cases arise, especially in connection with warship design, which can only be dealt with by means of model experiments in a satisfactory or conclusive manner, and, at present, private ship builders or ship owners have practically no means of dealing with such problems. To illustrate what is meant, reference may be made to the most interesting experiments carried out at Torquay in connection with the once famous controversy in regard to the inflexible type, and its behavior when the ends were riddled in action and water freely admitted above the protective deck. The results obtained from these experiments, which were arranged and conducted by the late Mr. William Froude, conclusively disposed of certain features in the controversy, and indicated the nature and limits of the risks which were involved in the adoption of the central citadel system of protection. In no other way could similar satisfactory results have been obtained. Model experiments have also been made to illustrate and confirm, for the benefit of those who could not follow methodical investigations, the effect of bilging compartments and admitting water to certain spaces in the interior of ships. In the experimental tank at St. Petersburg I was interested to see a model of the *Victoria*, which had been made at the instance of Admiral Makharoff for the purpose of illustrating my report on the causes which led to the foundering and capsizing of that vessel after her collision with the *Camperdown*. Rolling experiments in still water have also been made to determine the steadying effect of bilge keels, water chambers, and other arrangements for increasing steadiness at sea.

There are some of the principal directions in which, in my judgment, the proposed national experimental tank could be employed with great advantage to shipowners and shipbuilders in the immediate future. It has not been attempted to make this list exhaustive, but simply to illustrate, for the information of those who may not be familiar with the subject, the large possibilities afforded by such an establishment for effecting improvements and great economies in the design and construction of all classes of ships, and to justify the recommen-

dation with which I would conclude this paper, viz., that, without further delay, steps be taken to secure the establishment, in connection with the National Physical Laboratory, of a tank which shall be of service to the whole shipping community and especially devoted to research.

The establishment of this tank, and the provision of funds for its maintenance and working, are commended to the notice of the shipping interests with the assured conviction that the expenditure will be amply repaid by beneficial results and by large savings in expenditure of power and coal which will be obtained in all classes of ships, and particularly in ships of novel design or exceptional speed.

SIROCCO FANS ON DOMINION CRUISER.

The Sirocco Engineering Co., 22 Thames street, New York, is equipping the new cruiser now building for the Dominion government by the Polson Iron Works, Toronto, with two 25-in. diameter Sirocco fans for forced draft purposes. These fans possess special advantages for ship work owing to the saving in space which can be effected for a given duty while they are also very economical in horse power. The Sirocco fan has not been on the market very long, but it has already attained a leading position among machinery of this class. The chief point in the construction of Sirocco centrifugal fans may be summarized as follows:

The blades are very numerous with their radial measurement (relatively to the diameter of the fan), very shallow and their axial measurement very long. Their outer edges are curved forward in the direction of rotation, and the air passages between the blades are usually open at the ends towards the inflowing air. The inlet for admitting the air to the fan and also the outlet for its discharge are approximately of equal diameter to that of the fan itself. All these features practically constitute a reversal of previous theory and practice in regard to fan construction, and the practical effect of this new construction is that in Sirocco centrifugal fans the volume of air discharged per revolution is several times greater than in the best types of other centrifugal fans of equal diameter. The inlet and discharge openings for the air passing through the Sirocco centrifugal fans being, relatively to the fan diameter, about four times larger in area than in centrifugal fans of other standard makes, the frictional resistance to the passage of a given volume of air per minute through the Sirocco is therefore only a sixteenth of what it is in other centrifugal fans; consequently Sirocco centrifugal fans show a higher efficiency in actual work done for the power applied, and much less weight and bulk in relation to output.

The adjustment and arrangement of the outer edges of the blades, relatively to the inner edges, are such that Sirocco fans possess the remarkable peculiarity that the velocity of the air issuing from the discharge or delivery pipe of the fan exceeds the circumferential speed of the blades by about 80 per cent., whereas in other centrifugal fans it seldom equals and is generally less than the circumferential speed of the blades. As a consequence for a given duty Sirocco fans can be run at much lower speeds than other makes or at a given speed are capable of imparting a much higher velocity of air than other fans of equal diameter.

In Sirocco fans the construction of the blades is such that the detrimental eddies which occur in other fans are obviated. As the circumferential speed of the inner edges of the blades is only slightly less than that of the outer edges, the difference between the diameters of the respective circles being unusually small. The organ-like note caused by such internal eddies when the flow of air is at a high velocity is thus avoided so that the Sirocco fan is practically silent in operation even when running at a high speed.

HELPING OUR MERCHANT MARINE.

Congressman E. S. Minor of Sturgeon Bay, who represented the great lakes district on the Merchant Marine Commission, has returned to his home from the Pacific coast trip of the commission and in an interview said:

"It can be truthfully said that there was found to be a unanimity of sentiment among all those testifying before the commission favorable to the restoration of the American merchant marine to the important position it once occupied in the earlier history of our country. It should be kept in mind that in referring to the merchant marine our commission has to do with that branch of it engaged in the foreign trade only. In speaking or writing on this subject it is necessary to an intelligent understanding of the question to keep up the distinction between our coastwise marine and that branch of it engaged in the foreign trade. One branch of it has always prospered, because it has enjoyed the fostering care of our wise and efficient coastwise laws, while that part of it engaged in the over-sea trade has for nearly a half century rapidly and steadily declined, till now we have only 800,000 tons of steam and sail vessels engaged in this trade, carrying only 8 per cent of our exports and imports, while the foreign bottoms carry 92 per cent, and we pay annually to ships flying foreign flags as freight and passage charges nearly or quite \$200,000,000! This is a drain upon our resources that is more likely to be increased than diminished. The thoughtful and patriotic American citizen naturally begins to view this unfortunate situation with seriousness if not alarm. The want of ships of our own, flying the flag of our country, owned and officered by our own citizens, is a serious hindrance to our trade in time of peace, and no less than a menace in time of war. This is a commercial age. The contest is not between individuals or corporations, but between at least three of the greatest industrial nations of the earth. The United States being one of them. If the United States is to hold its place in this industrial and commercial race, we must do as well as other great powers have done and are now doing, viz.: aid our shipping engaged in trade with other countries.

"The commission is facing a serious and complicated problem, one that will require much thought and the highest order of intelligence, coupled with wisdom that must come largely from those who have had a practical experience in handling the great transportation business of our country—and that means the greatest in the world.

"The commission at all times and in all places where it gave hearings invited men of all classes to come before it and give free expression to their views no matter what they might be. And it is with pleasure that I am able to state that wherever we were—on the Atlantic or Pacific coast or in the great lakes cities—there was a hearty response to our request for information that has truly been encouraging. A true spirit of Americanism has been manifested everywhere and not one of the 200 able gentlemen who appeared before us dissented from the consensus of opinion the great mass of our citizens entertain that the time has come when something must be done to build up our merchant marine engaged in our foreign or over-sea trade. While many plans for restoring our flag to the sea have been suggested no specific remedy for its absence has been insisted on.

"Direct communication between our own and foreign countries has been pointed out as of great importance to our people. This can only be done effectively by ships of our own country. Steamship lines plying between American and foreign ports owned by American citizens and capable of making a fair rate of speed so that our mails can be promptly delivered and received, also of affording accommodations for passengers and freight, thereby enabling the American produce and foreign consumer to come more nearly in touch with each other, has been very strongly urged by men of all shades of politics, whether they were owners, shippers, bankers, mer-

chants or sailors. Many intelligent witnesses have given it as their opinion that it would be wise for the government to acquire by purchase or construction a limited number of sailing ships for the training and educating of American boys, in order to properly fit them for a sea-faring life. It is urged by the advocates of this policy that by regularly enlisting these young men and paying them a reasonable compensation for a period of three or more years with the provision that in case of emergency they would become a part of the naval force, that it would be a wise expenditure of public money. By the adoption of this policy it is urged that in case of the up-building of our merchant marine we would have competent men for officers, and, in case of war, we would be sure of the American boy behind the gun."

REPORT OF BOILER COMMITTEE.

The committee appointed by the British admiralty to experiment and report on naval boilers have completed their work and sent in their final report which contains a great deal of information. The committee believes that the advantages of water-tube boilers are so great, particularly from a military point of view, that, provided a satisfactory type of water-tube boiler can be adopted, it would be more suitable for use in the navy than the cylindrical type. They suggested further trials of Babcock & Wilcox, Niclausse, Dürr, and Yarrow boilers. The results of these further trials were sufficiently promising to justify the use of these boilers in the British navy in combination with cylindrical boilers. Having concluded their experimental investigation, the committee are now satisfied that two of these four types, viz., the Babcock & Wilcox, similar to that tried in the *Hermes*, and the Yarrow large-tube, similar to that tried in the *Medea*, are satisfactory and are suitable for use in battleships and cruisers without cylindrical boilers. In the Babcock & Wilcox boiler the generating tubes are nearly horizontal, in the Yarrow boiler they are nearly vertical. Each type has its particular advantages, and only long experience on general service can show which is, on the whole, the better boiler. For the present the committee unanimously recommend both types as suitable for naval requirements. In making these recommendations the committee recognize that the upkeep of any water-tube boiler is likely to be heavier than that of the cylindrical boiler, but they are of opinion that the two types they now recommend will cost less for upkeep than the other types of large straight-tube boiler which they have had under trial.

The question of safety being disposed of, next comes that of economy. The results are, on the whole, satisfactory. The Howdenized cylindrical boiler comes first with a thermal efficiency of 82.3 per cent. The best results obtained with the Babcock & Wilcox boiler of the *Hermes* were during trials of furnace gas baffling, the boilers in the middle boiler room with vertical baffles and a forced air supply over the fires giving the high efficiency of 81 per cent on a 30 hours' trial, when 20 pounds of coal were being burnt per square foot of fire grate per hour, and an efficiency of 77.8 per cent on a 29 hours' trial when burning 27 pounds per square foot, these rates of combustion corresponding to the ordinary rate of steaming and to the full power of the boilers respectively.

The maximum efficiency of the Yarrow boilers of the *Medea*, viz., 75.7 per cent, was obtained on a 26 hours' trial when burning 18 pounds per square foot per hour; their efficiency, when burning at the maximum rate of combustion, viz., 40 pounds per square foot per hour for 8 hours, was 69.5 per cent. On trials of over 24 hours' duration each, burning from 17 pounds to 21 pounds per square foot per hour, the efficiency remained at or over 75 per cent.

The Belleville boilers of the *Hyacinth* had a maximum efficiency of 77.2 per cent recorded on a 24½ hours' trial, when 16 pounds of coal were being burnt per square foot of

fire-grate per hour. When burning 20 pounds per square foot per hour for 11 hours, the efficiency was 73.3 per cent, and burning 17.4 pounds for 24 hours, it was 71.8 per cent. The efficiency of these boilers on an 8 hours' trial in fine weather, when burning 27 pounds per square foot per hour, corresponding to the full output of the boiler, was 65 per cent.

The maximum efficiency of the Dürr boilers of the Medusa was 64.8 per cent, obtained on an 8 hours' trial, when burning 35 pounds per square foot per hour, this being the maximum rate of combustion with these boilers; the efficiency, when burning 16 pounds per square foot per hour for 26 hours, was 63.8 per cent. On trials of over 24 hours' duration each, and burning 18 pounds and 21 pounds per square foot, the efficiencies were 61.7 per cent and 60.3 per cent respectively.

The committee then consider the results obtained in the smaller vessel, but these are not of much importance. As regards the quality of the steam, the Yarrow large-tube and the Babcock & Wilcox boilers have given the best results. The loss of feed-water with each of the four types named has been small in the committee's experience.

In none of the four types of water-tube boiler which were recommended for trial by the committee has there been any considerable corrosive decay of tubes, and the ordinary wear has been very slight. On the conclusion of the committee's trials the tubes of the boilers of the Medea and Hermes had not deteriorated to any appreciable extent. This applies also to the Medusa, except that the internal tubes have shown signs of roughening.

ANALYSIS OF STAYBOLT IRON.

Mr. John Livingstone, a noted engineer of Montreal, Canada, has just sent to the Falls Hollow Staybolt Co., Cuyahoga Falls, O., a very comprehensive analysis of the qualities of the company's staybolt iron. The company claims that it is the only elastic staybolt iron in the world, and in answer to that claim Mr. Livingstone says:

"At no stage of the manufacture of iron, from the ore to the rolls, is iron flexible or elastic. It is in its different stages crystalline, brittle, fluid, fibrous, ductile, but never elastic. No ingenuity can make it elastic. You can no more make it elastic than you can make a wooden or bone leg as flexible as a natural leg. The iron is ductile and its nature cannot be changed except by its union with carbon. In that way you change the breed, you make steel. It is because your bolt is hollow from end to end that a concentrated current of air (which is elastic) passes through it."

He also finds that staybolt iron is the only staybolt which relieves the material. He says that in all other bolts there is no relief from the vibration which causes a crushing in of the atoms or particles in material, one upon another, with real and resulting internal expansion, opposing the coherence of the particles, and though not visible, it is the chief factor in the breakage of the bolts. The hollow staybolt is cooled by the passage of air through it. A hot bolt will expand less and cool faster in a current of air than in a still atmosphere, while a solid bolt cannot cool nor fail to expand in the presence of heat to the great grief in the material from the vibration.

To this general claim that the hollow staybolt is the staybolt which lasts the longest, causes the least repairs, gives the longest life to the fire-box and the longest service in the engine on the rails, Mr. Livingstone finds that it is so because the quality of the material is the best. With a one-eighth hole through the center the hollow bolt of usual size is stronger than the solid bolt of like sizes. The solid has no relief from the heat, the expansion, contraction, compression of its atoms at the core, with the resulting heat and expansion there resisting the coherence of the particles, while the hollow staybolt has relief from all these conditions with which the solid size staybolt is at war.

GOLD MEDAL FOR CHARLES A. PARSONS.

Eleven sections of the British Association for the Advancement of Science began work at Cambridge, Eng., this week. Mr. Arthur Balfour, premier of England, who is president of the association this year, attended the engineering section where, on behalf of the associated German engineers, he presented a gold medal to the president of the section, Mr. Charles A. Parsons, in recognition of his merits as an inventor. Mr. Parsons is the developer of a steam turbine. Mr. Parsons' address was a long and interesting one, dealing with inventions and patents. He urged that greater encouragement, assistance and protection be given to the British inventor and patentee by the state along the lines adopted by Germany and the United States. He strongly advocated changes in the patent law of all countries, especially in regard to the extension of time limit. As an illustration Mr. Parsons gave details of a scheme for the sinking of a shaft to a great distance in order to explore the lower depths of the earth. He submitted estimates of the cost and time of sinking a shaft from ten to twelve miles. To sink a shaft to the latter depth he said would cost \$25,000,000 and take about eighty-five years. Obviously such an undertaking could not depend upon a patent, because under the present laws it would be impossible to secure the necessary capital. Mr. Parsons suggested that as a solution of the problem the placing of the question of life patents under the control of a central international committee which would apportion the life privileges, thus insuring the prolongation of patents and making them of international application.

PRODUCTION OF IRON ORE IN 1903.

John Birkinbine in his report made for the United States geological survey shows that the quantity of ore produced in the United States in 1903 was 35,019,308 long tons. This is a decrease of 534,827 long tons from the maximum of 35,554,135 long tons in 1902. The quantity mined in 1903, however, is the second largest recorded and is greater than the combined totals for the year 1902 of Germany, the Luxembourg and the British empire. The iron ore trade in 1903 came from twenty-two states and two territories. The Lake Superior district stands pre-eminent, of course, as a producer of iron ore. Its annual output exceeds that of any foreign country and its average quality of ore is excellent. In 1903 the Mesabi and Vermillion ranges in Minnesota, the Marquette range in Michigan and the Menominee and Gogebic ranges in Michigan and Wisconsin produced a total of 26,573,271 long tons of iron ore. Of this ore the Mesabi range alone produced 51 per cent.

The total value at the mine of the 35,019,308 long tons of iron ore produced by the United States last year was \$66,328,415, or \$1.89 a ton, an increase of 5 cents a ton over the value of a ton in 1902. During the year 980,440 long tons were imported into this country from Cuba, Canada, Spain, Newfoundland, Algeria, Great Britain and Germany.

The steam yacht *Buccaneer*, formerly the property of Mr. Lucius G. Fisher of Chicago, has been sold by Gardner & Cox of New York to Mr. J. Rosenbaum of Chicago, who will at once have the vessel taken up through the St. Lawrence and delivered to him at Chicago. The *Buccaneer* is a steel vessel 148 ft. over all, 20 ft. beam, 9 ft. draught, and is remarkable for the elaborate nature of her furnishings. An immense sum of money has been expended in expensive hand-carved work, and in every particular the interior of the vessel has been treated in such a manner as to give an appearance that will be in harmony with her name. All the woodwork is of antique Flemish oak and the furnishings are in dark leather, the hardware on the doors and the lanterns used for electric light are of wrought iron, thus giving a most unusual effect. She will undoubtedly receive much attention on the lakes.

TRADE NOTES.

The Engineering Co. of America, 74 Broadway, New York, has issued a preliminary pamphlet upon concrete construction. The catalogue gives a very good description of what concrete is.

Porter & Berg, electric railway and mine supplies, 303-305 Dearborn street, Chicago, are putting out the Violet ray lamp for photo-engraving and blue printing. It is represented that the lamp shortens the time of exposure for printing.

The Foos Gas Engine Co., Springfield, O., have issued a huge postal card to the effect that their forty-page catalogue is free to intending purchasers. They are makers of gas engines from 2 to 80 H. P., and carry them in stock in all large cities.

The Turbine Engineering Co. has opened offices at 1207 Fisher building, Chicago. The company is selling agent for the De Laval Steam Turbine Co. in the following states: Illinois, Indiana, Michigan, Iowa, Missouri, Kansas and Nebraska.

The firm of John F. Allen, 370-372 Gerard avenue, New York city, have recently entered into agreement with John Turnbull, Jun & Sons, 190 West George street, Glasgow, Scotland, whereby they are to handle the Allen riveters for one year in Great Britain.

The Lamb Boat & Engine Co., Clinton, Iowa, manufacturer of high-grade pleasure craft, state in their latest catalogue that they are prepared to furnish two and four cycle marine motors, house-boats, single or twin-screw launches of various designs, as well as auto-boats.

The Fort Wayne Electrical Works, Fort Wayne, Ind., have issued two bulletins, one devoted to multi-phase revolving field belted generators and the other to their type A transformers. Both bulletins are very thorough and will be sent to anyone interested in the subject.

H. C. Doman Co., Oshkosh, Wis., engine and launch builders, have just issued a little folder devoted to the Doman marine gasoline engine, accompanied with various recommendations from persons that have bought them. These engines are constructed on the four-cycle type and have made good reputations for themselves.

John F. Allen, 370-372 Gerard ave., New York city, the manufacturer of the Allen riveting machines, has signed a five years contract with Fenwick, Freres & Co., 21 Rue Martel, whereby they are to have control of the Allen tools in France, Italy, Spain, Portugal and Belgium. They intend to carry the Allen machines in stock in their various branch houses.

The Anderson marine gasoline engine manufactured by the Anderson Boat & Engine Co., 142-150 West North ave., Chicago, has gained for itself an excellent reputation and is claimed to be one of the foremost of its class. It is built on the well-known four-cycle principle. All parts are made of the best material and are guaranteed against breakage.

"Two Sides to a Story" is an interesting folder from H. W. Johns-Manville Co., 100 William street, New York, regarding Mobilene, a sheet packing for gas and gasoline engines for stationary, marine or motor vehicle service. Mobilene is furnished in sheets 40 in. square or in rolls of the same width. It is 1 to 32 in. thick and weighs 4 lbs. per square yard.

The Nernst Lamp Co. of Pittsburg has just issued a little booklet concerning the street lighting by Nernst lamps in Berwin, Ill. It is a reprint from the Western Electrician, and like everything that comes from the Westinghouse Co., is most beautifully done. The little booklet, which is crowded with information concerning the success of the Nernst lamp as a street lighter, will be sent to any one upon request.

The Duluth Gas Engine Works, Duluth, Minn., manufacturers of one of the best and latest improved two-cycle marine motors, and the famous Crescent reversible speed propeller, have announced their annual clearance sale for 1904 of marine motors and launches. Many take advantage of these annual

sales and thereby procure for themselves a marine outfit worth having at a nominal cost. The catalogue can be had for the asking.

The New Jersey Zinc Co. at 71 Broadway, New York, say that in every sea that is furrowed by prows of trade oxide of zinc holds its own against the elements, representing that it is the only white pigment that can withstand marine exposure. They have three pamphlets which are free to anyone interested in the subject. The titles of these little booklets are the "Paint Question," "Paints in Architecture," "Paint: How, Why and When."

A very excellent catalogue in two colors has just been issued by the Truscott Boat Mfg. Co., St. Joseph, Mich., as a supplemental catalogue. It is printed in two colors, black and brown, and is illustrated throughout with vignetted half-tones of the products of the Truscott plant. It gives a very thorough description of the engines and launches made by this company, and anyone who has in mind the purchase of a motor-boat or launch would do well to write for it.

The United States Metallic Packing Co. of Philadelphia has just issued a little catalogue descriptive of packings for marine and stationary engines. The company makes an engineering specialty of packing valve stems and piston rods on steam engines for all pressures and temperature of steam. This company has been making metallic rod packings for a quarter of a century and has managed to always have them meet the requirements of the times and by constant improvement has kept face to face with modern steam engineering practice.

The Abner Doble Engineering Co., San Francisco, Cal., have issued a very tasty bulletin concerning their tangential ellipsoidal water wheel. All the wheels made by this company are provided with their well-known patented ellipsoidal buckets. Each bucket straddles the wheel rim and is machined to fit tightly on both sides and on the periphery. The buckets are interchangeable, being accurately fitted and drilled in jigs and are finally brought to the same weight so that the wheel is dynamically balanced. The hydraulic surfaces of the buckets are ground smooth and the dividing wedge and entrance wedges accurately sharpened. The catalogue, which is of high workmanship, will be sent to anyone interested.

The Barriett Electric Co., Cincinnati, O., manufacturers of electric motors and dynamos, have just issued a very tasty booklet entitled "Bulletin No. 4" descriptive of the Barriett motor. All of the sizes of these motors were most scientifically designed and are calculated to be used for operating important machinery where absolute reliability is required and in places where the cost of operation is more important than the first cost of the motor. They are not intended to compete in price with the ordinary motor, but to effect the greatest economy in operating, which of course is in the long run the real economy. The bulletin is very beautifully illustrated with wash drawings of the motors and also line drawings of the various parts.

The United Telpherage Co., 20-22 Broad street, New York, has just issued a circular concerning the advantages of telpherage for the handling of coal, coke and ashes for factory and mills and large consumers of fuel, with special reference to a reserve coal storage. The enormous quantity of coal being consumed by gas companies, railroads and lighting companies make it imperative that a storage should be provided of sufficient capacity to forestall any scarcity that may occur from strikes and an increase of price. The model coal storage is such that either anthracite, bituminous or run of mine coal may be placed in storage and then removed with great rapidity and with a minimum of labor and expense to the place of consumption. The catalogue then gives a description of the telpher with a train of buckets and its capacity for doing the work. The circular is illustrated with photographs and line drawings and will be sent to anyone interested.



VOL. XXX.

CLEVELAND, O., AUGUST 25, 1904.

No. 8

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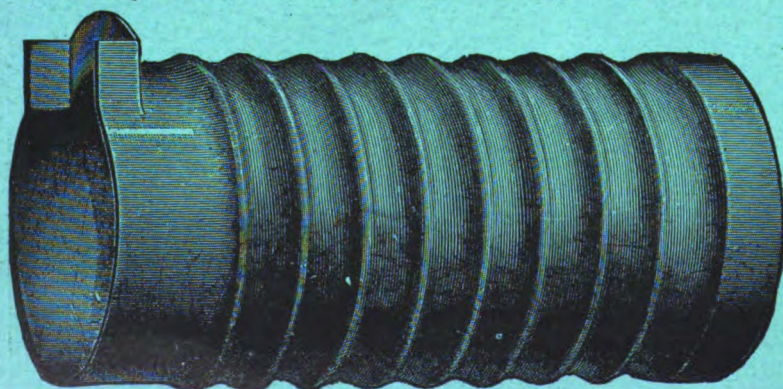
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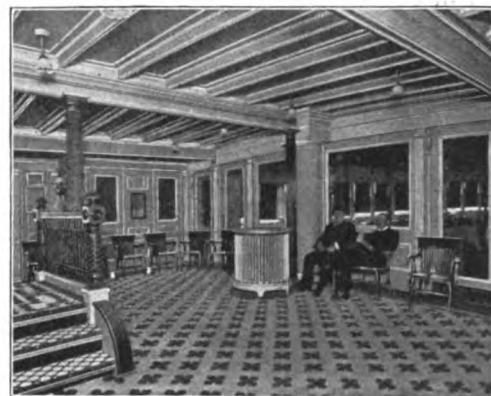
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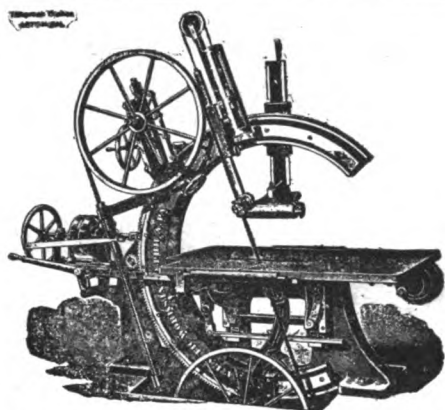
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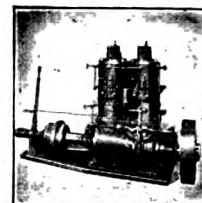
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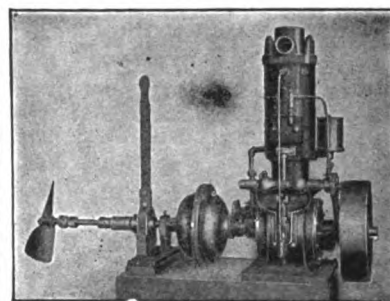
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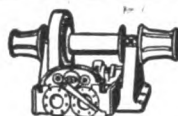
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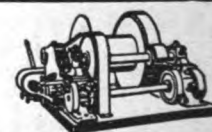
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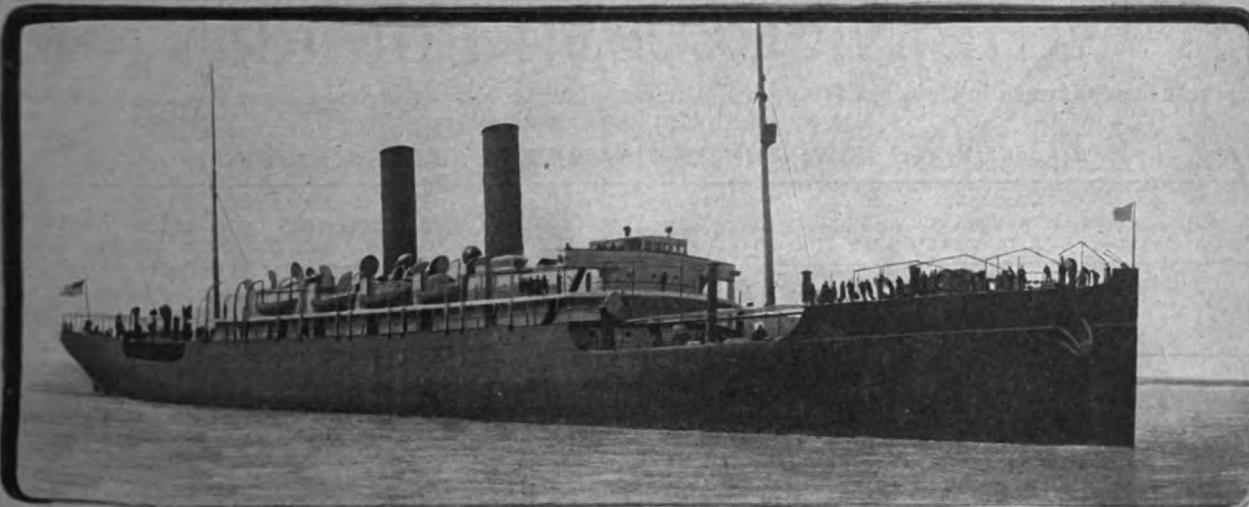
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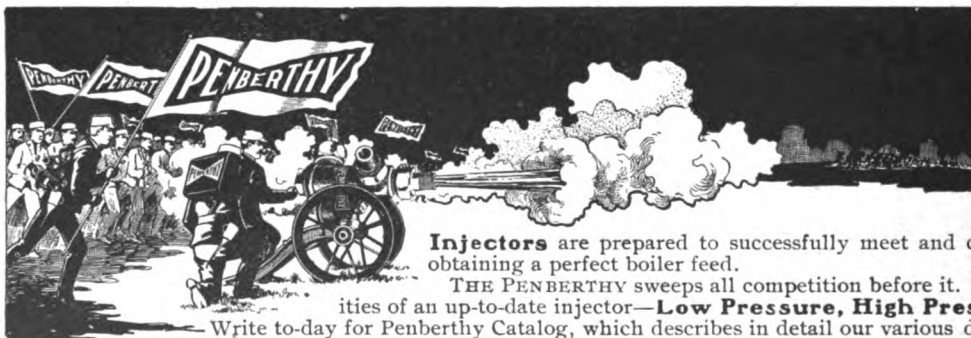
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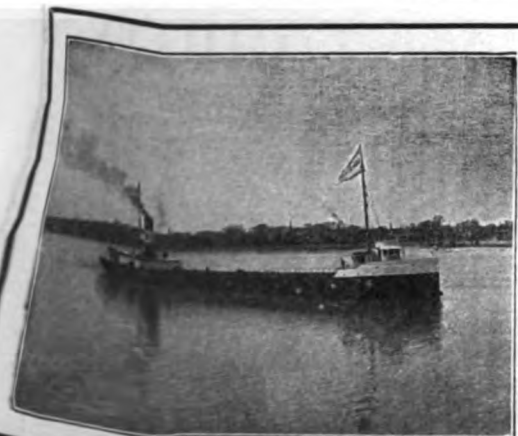
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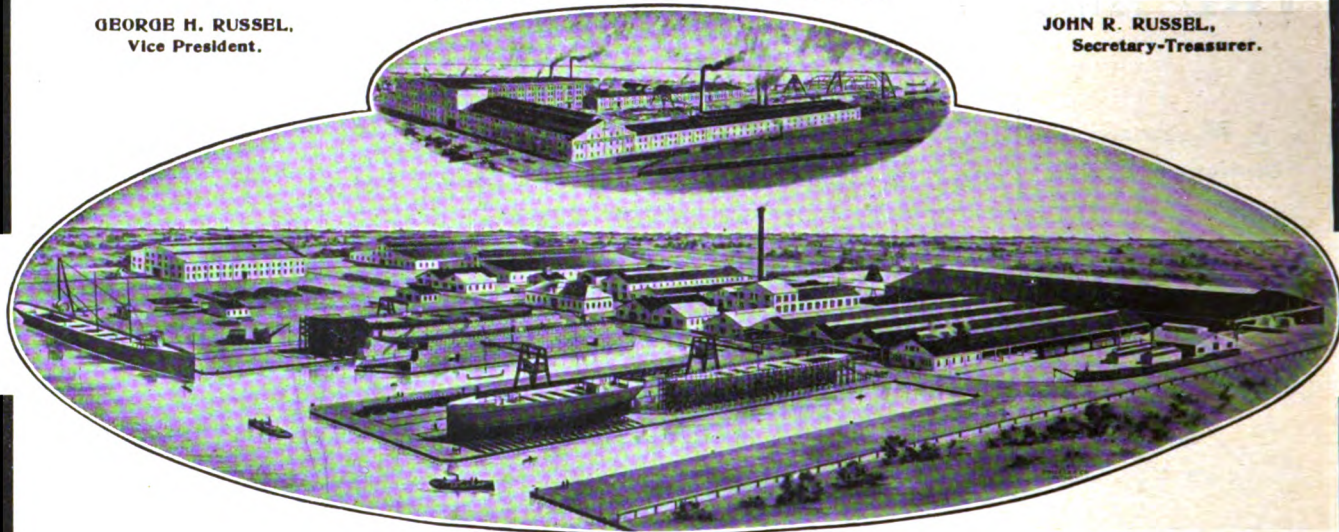
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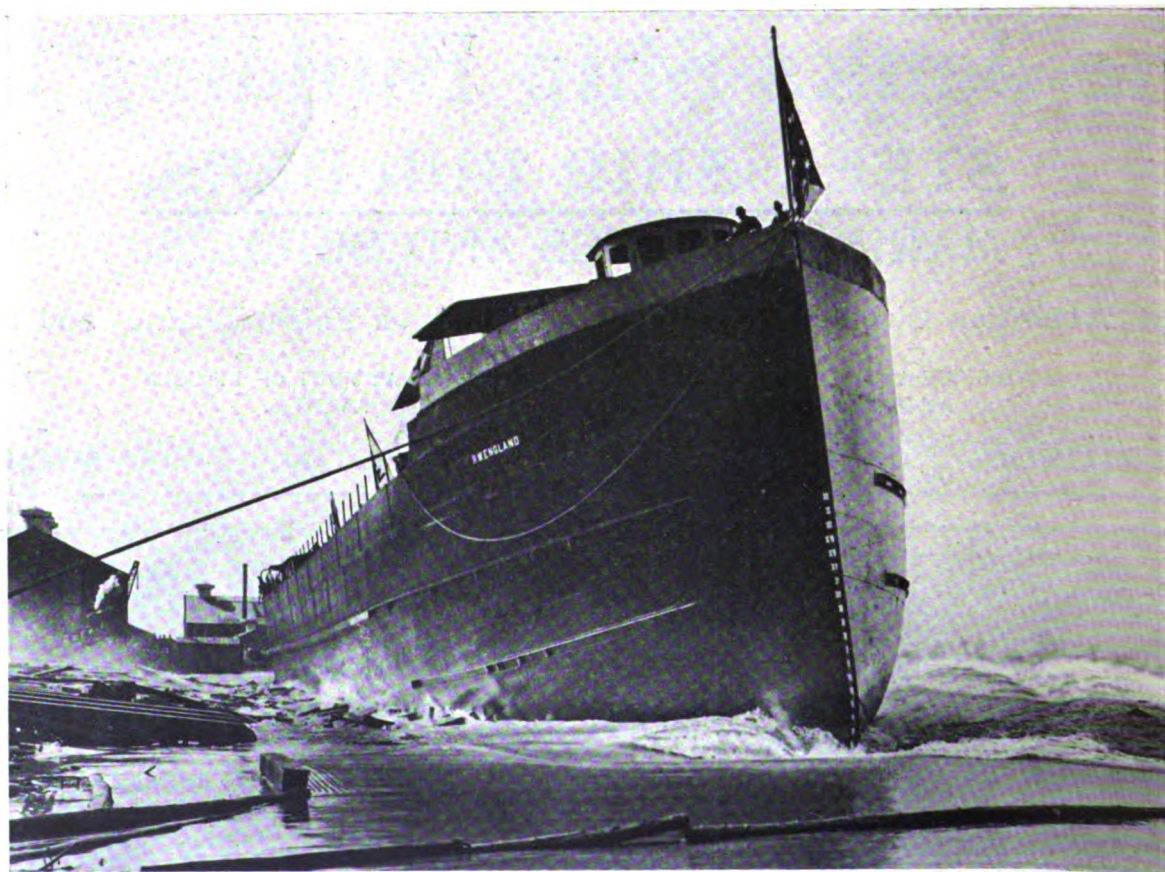
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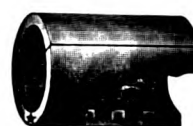
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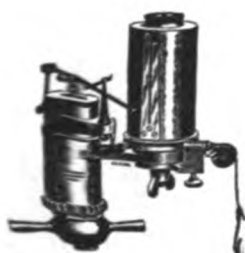
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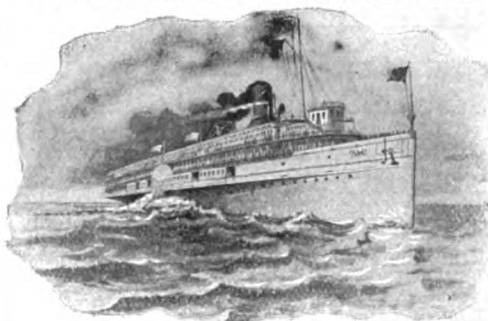
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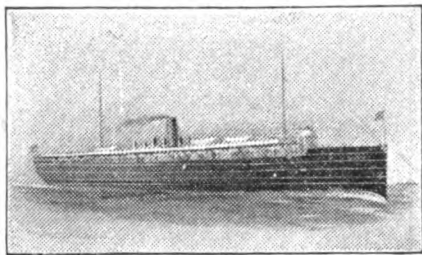
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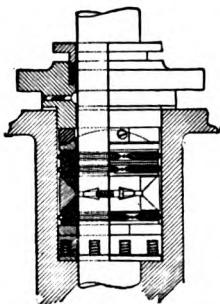
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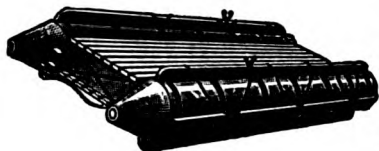
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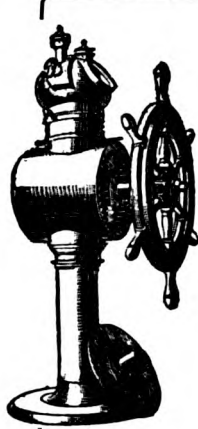
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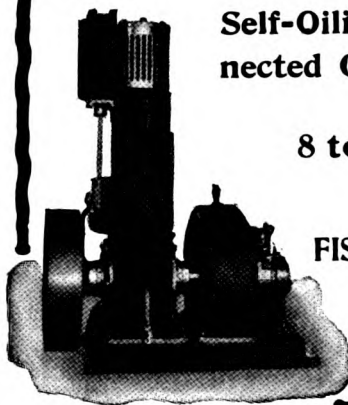


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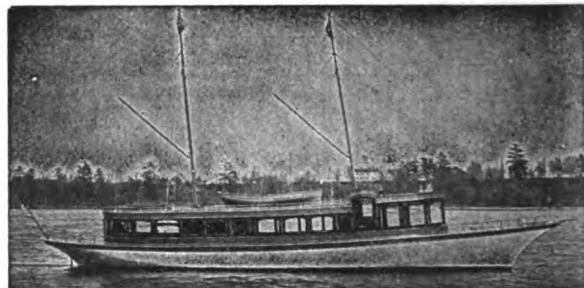
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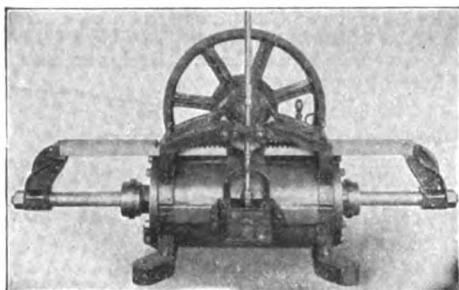
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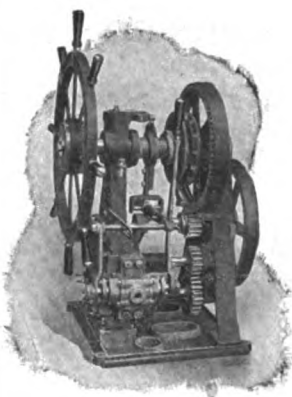
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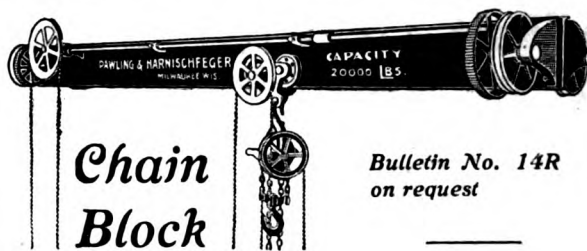
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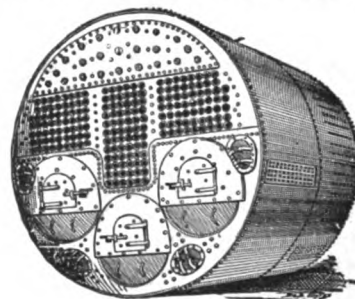
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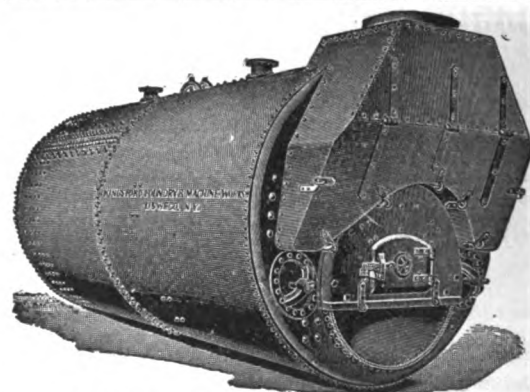
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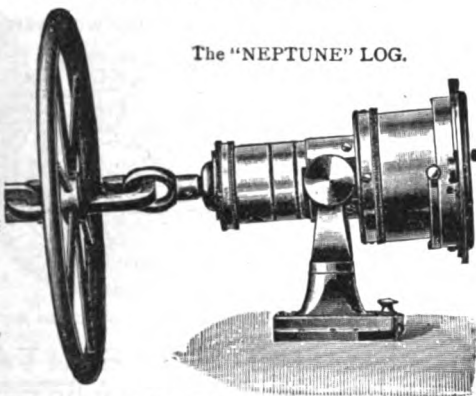
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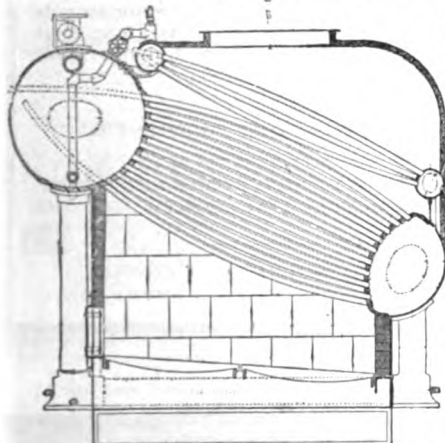
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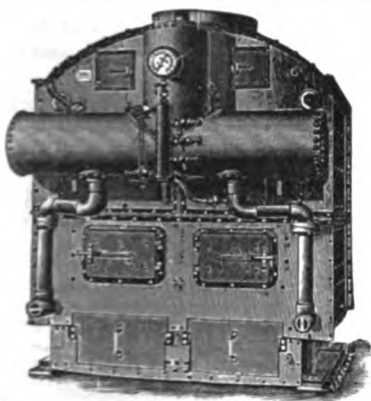
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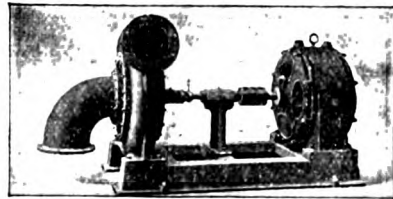
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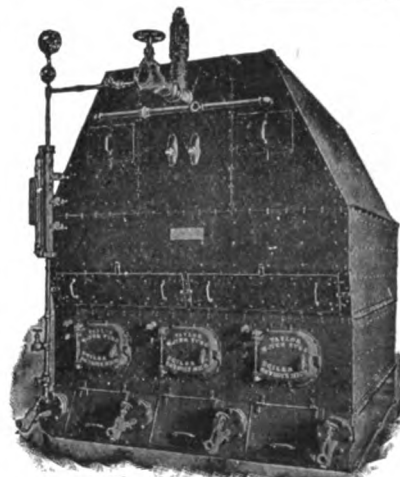
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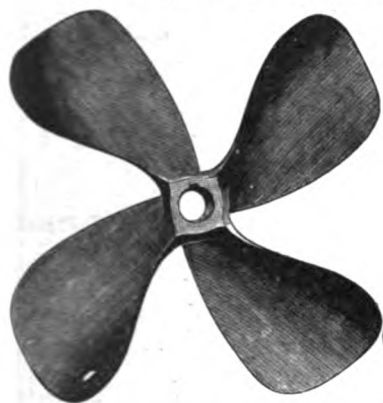
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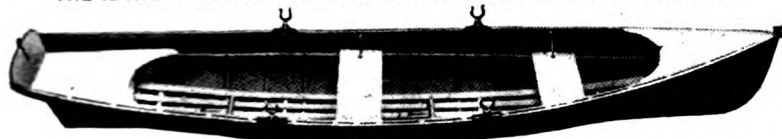
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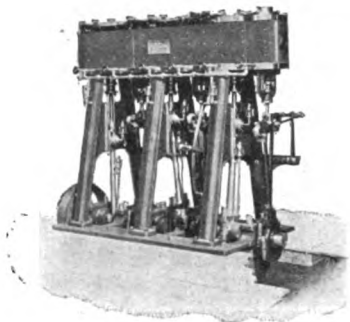
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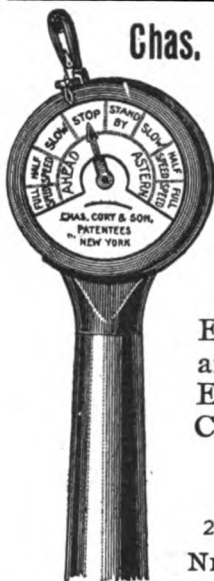
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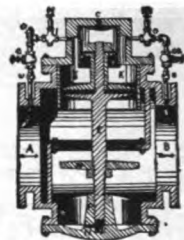
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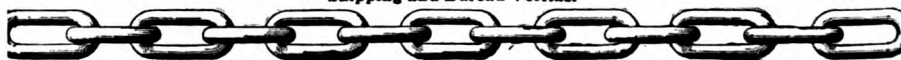
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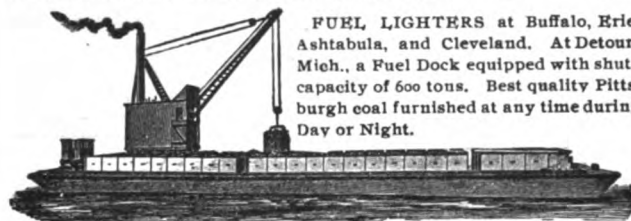
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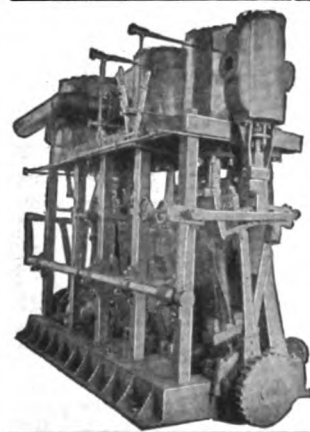
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FEED WATER PURIFIERS AND HEATERS.

Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.
Fore River Ship & Engine Co., Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons.....Cleveland.

FUEL ECONOMIZERS.

Sturtevant Co., B. F.....Hyde Park, Mass.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville, Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Picklands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.
Georgian Bay Engineering Works.....
.....Midland, Ont.
Reliance Mfg. Co.....City Island, New York.
Temple Pump Co.....Chicago.

GAUGES, STEAM AND VACUUM.

American Steam Gauge & Valve Mfg. Co.....
.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.
Standard Gauge Mfg. Co.....Syracuse, N. Y.

GAUGES, WATER.

Bonner & Co., Wm. T.....Boston.
Lunkenheimer Co.....Cincinnati, O.
Standard Gauge Mfg. Co.....Syracuse, N. Y.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.).....
.....Cleveland.
Chase Machine Co.....Cleveland.
General Electric Co.....New York.
Georgian Bay Engineering Works.....
.....Midland, Ont.
Hyde Windlass Co.....Bath, Me.
Marine Iron Co.....Bay City.
Mietz, Aug.New York.
Pawling & Harnischfeger.....Milwaukee.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros.....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H.....Chicago.
Frankfort Marine, A. & P. G. Ins. Co.....
.....New York.

INSURANCE, MARINE—Continued.

Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F.....New York & Chicago.
Prindville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Voss, F. D.....New York.

IRON ORE AND PIG IRON.

Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Georgian Bay Engineering Works.....
.....Midland, Ont.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P.....Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D.....New York.

LIGHTS, SIDE AND SIGNAL.

Russell & Watson.....Buffalo.

LOGS.

Walker & Sons, Thomas.....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.

Crane Co.....Chicago.
Lunkenheimer Co.....Cincinnati.

LUMBER.

Martin-Barriss Co.....Cleveland.

MACHINISTS.

Chase Machine Co.....Cleveland.
Gogebic Steam Boiler Works.....Duluth, Minn.
Hickler Bros.....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Union Machine & Boiler Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros.....Sault Ste. Marie, Mich.

MARINE GLUE.

Ferdinand & Co., L. W.....Boston, Mass.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

MELTING POT AND PAYING LADLE.

(For Paying Seams of Decks with Marine Glue.)

Ferdinand & Co., L. W.....Boston.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Hyde Park, Mass.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

Buyers' Directory of the Marine Trade.—Continued.

NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.

Hynd, Alexander.....Cleveland.
 Kidd, Joseph.....Duluth, Minn.
 Lovejoy, H. O.....Buffalo.
 Matteson & Drake.....Philadelphia.
 Mosher, Chas. D.....New York.
 Nacey, James.....Cleveland.
 Rice, Henry.....Buffalo.
 Sadler, Perkins & Field.....New York.
 Steel, Adam.....Cleveland.
 Wood, W. J.....Chicago.

OAKUM.

DeGrauw, Aymar & Co.....New York.
 Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.

Mietz, Aug.New York.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
 Standard Oil Co.....Cleveland.

PACKING.

Crane Co.Chicago.
 Jenkins Bros.New York.
 Katzenstein, L. & Co.....New York.
 New York Belting & Packing Co.....New York.

PACKING TOOL.

Matteson & DrakePhiladelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
 Detroit Varnish Co.....Detroit.
 Detroit White Lead Works.....Detroit.
 Forest City Paint and Varnish Co.....Cleveland.
 New Jersey Zinc Co.....New York.
 Upson-Walton Co.Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
 Chicago & Gt. Lakes Dredge & Dock Co.....Chicago.
 Dunbar & Sullivan Dredging Co.....Buffalo.
 Fitz-Simons & Connell Co.....Chicago.
 Hickler Bros.Sault Ste. Marie, Mich.
 Lake Superior Contracting & Dredging Co.....Duluth, Minn.
 Parker Bros. Co., Ltd.....Detroit.
 Smith Co., L. P. & J. A.....Cleveland.
 Starke Dredge & Dock Co., C. H.....Milwaukee.
 Sullivan, M.Detroit.

PIPE, WROUGHT IRON.

Crane Co.Chicago.
 Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.
 Otis Steel Co.....Cleveland.

PNEUMATIC TOOLS.

Allen, John F.....New York.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

PRESSURE REGULATORS.

Kieley & MuellerNew York.
 Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
 Atlantic WorksEast Boston, Mass.
 Cramp, Wm. & Sons.....Philadelphia.
 Detroit Ship Building Co.....Detroit.
 Fore River Ship & Engine Co., Quincy, Mass.
 Great Lakes Engineering Works.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Jenks Ship Building Co.....Port Huron, Mich.
 Lockwood Mfg. Co.....East Boston, Mass.
 Macbeth Iron Co.....Cleveland.
 Milwaukee Dry Dock Co.....Milwaukee.
 Newport News Ship Building Co.....Newport News, Va.
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.
 Roelker, H. B.....New York.
 Sheriffs Mfg. Co.....Milwaukee.
 Superior Ship Building Co.....Superior, Wis.
 Thropp & Sons Co., J. E.....Trenton, N. J.
 Trout, H. G.....Buffalo.
 United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
 Great Lakes Engineering Works.....Detroit.
 Kingsford Foundry & Machine Works.....Oswego, N. Y.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.....New York.

RANGES.

Russell & WatsonBuffalo

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
 Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes RegisterCleveland.
 Record of American & Foreign Shipping.....New York.

REPAIRS—ENGINE AND BOILER.

(See also Boiler Manufacturers and Engine Builders.)
 Georgian Bay Engineering Works.....Midland, Ont.

Gogebic Steam Boiler Works.....Duluth, Minn.
 Forest City Boiler Co.....Cleveland.
 Marine Iron Co.....Duluth, Minn.

RIVETING MACHINES.

Allen, John F.....New York.

ROWBOATS.

Mullins, W. H.....Salem, O.

SAFETY VALVES.

American Steam Gauge & Valve Mfg. Co.....Boston.
 Ashton Valve Co.....Boston.
 Crane Co.Chicago.
 Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
 Upson-Walton Co.....Cleveland.
 Wilson & SilsbyBoston.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Otis Steel Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
 Atlantic WorksEast Boston, Mass.
 Bertram Engine Works Co., Ltd.....Toronto, Can.
 Buffalo Dry Dock Co.....Buffalo.
 Cramp, Wm. & Sons.....Philadelphia.
 Craig Ship Building Co.....Toledo, O.
 Chicago Ship Building Co.....Chicago.
 Detroit Ship Building Co.....Detroit.
 Fore River Ship & Engine Co., Quincy, Mass.
 Great Lakes Engineering Works.....Detroit.
 Jenks Ship Building Co.....Port Huron, Mich.
 Lockwood Mfg. Co.....East Boston, Mass.
 Manitowoc Dry Dock Co.....Manitowoc, Wis.
 Milwaukee Dry Dock Co.....Milwaukee.
 Newport News Ship Building Co.....Newport News, Va.
 Roach's Ship YardChester, Pa.
 Shipowner's Dry Dock Co.....Chicago.
 Smith & Son, Abram.....Algonac, Mich.
 United States Ship Building Co.....New York.
 Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
 Marine Mfg. & Supply Co.....New York.
 Upson-Walton Co.....Cleveland.

SHIP LANTERNS AND LAMPS.

Russell & WatsonBuffalo.

SHIP TIMBER.

Martin-Barriss Co.....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Gilchrist & Co., C. P.Cleveland.
 Holmes, SamuelNew York.
 Lester, S. S.....Quebec, Can.
 McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.

American LineNew York.
 Anchor LineBuffalo.
 Boston Steamship Co.....Boston.
 Cleveland & Buffalo Transit Co.....Cleveland.
 Detroit & Cleveland Line.....Buffalo.
 Erie & Western Trans. Co.....Buffalo.
 Goodrich Trans. Co.....Chicago.
 International Mercantile Marine Co.....Philadelphia.
 Manitou Steamship Co.....Chicago.
 Mexican-American S. S. Co.....New Orleans, La.
 New York & Cuba Mail S. S. Co.....New York.
 Niagara, St. Catharines & Toronto Ry. & Nav. Co.....St. Catharines, Ont.
 Northern Michigan Trans. Co.....Chicago.
 Red Star LineNew York.
 Richelieu & Ontario Nav. Co.....Montreal, Can.
 United Fruit CoBoston.

STEEL CASTINGS.

Macbeth Iron Co.....Cleveland.
 Otis Steel Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
 Chase Machine Co.....Cleveland.
 Dake Engine Co.....Grand Haven, Mich.
 Detroit Ship Building Co.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Jenks Ship Building Co.....Port Huron, Mich.
 Marine Mfg. & Supply Co.....Cleveland.
 Moulton Steering Engine Co.....New York.
 Pawling & HarnischfegerMilwaukee.
 Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
 Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Gaskin, EdwardBuffalo.
 Hynd, AlexanderCleveland.
 Lovejoy, H. O.....Buffalo.
 Matteson & DrakePhiladelphia.
 Parker Bros. Co., Ltd.....Detroit.
 Nacey, James.....Cleveland.
 Rice, Henry.....Buffalo.
 Steel, Adam.....Cleveland.
 Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
 Pittsburg Testing Laboratory, Ltd.....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F.....New York.
 Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
 Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.
 Great Lakes Towing Co.....Cleveland.
 Midland Towing & Wrecking Co., Ltd.....Midland, Ont.

TRAPS, STEAM.

Kieley & MuellerNew York.
 Lunkenheimer Co., B. F.,Hyde Park, Mass.

TRUCKS.

Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

Buyers' Directory of the Marine Trade.—Continued.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge & Valve Mfg. Co. Boston.
 Ashton Valve Co. Boston.
 Crane Co. Chicago.
 Jenkins Bros. New York.
 Kieley & Mueller New York.
 Lunkenheimer Co. Cincinnati.
 Ross Valve Co. Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. Troy, N. Y.

VARNISHES.

Detroit Varnish Co. Detroit.
 Detroit White Lead Works. Detroit.
 Forest City Paint & Varnish Co. Cleveland.
 New Jersey Zinc Co. New York.
 Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. Hyde Park, Mass.

VESSEL AND FREIGHT AGENTS.

Boland, John J. Buffalo.
 Brown & Co. Buffalo.
 Elmhurst, C. W. & Co. Chicago.
 Fleming & Co., P. H. Chicago.
 Gilchrist & Co., C. P. Cleveland.
 Hall & Root Buffalo.
 Helm & Co., D. T. Duluth.

VESSEL AND FREIGHT AGENTS—Con.

Hawgood & Co., W. A. Cleveland.
 Holmes, Samuel New York.
 Hutchinson & Co. Cleveland.
 Lester, S. S. Quebec, Can.
 McCarthy, T. R. Montreal.
 Mitchell & Co. Cleveland.
 Parker Bros. Co., Ltd. Detroit.
 Prindiville & Co. Chicago.
 Richardson, W. C. Cleveland.
 Sullivan, D. & Co. Chicago.

WATER GAUGES.

Bonner & Co., Wm. T. Boston.
 Lunkenheimer Co. Cincinnati, O.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. Buffalo.
 DeGrauw, Aymar & Co. New York.
 Upson-Walton Co. Cleveland.

WHISTLES, STEAM.

American Steam Gauge & Valve Mfg. Co.
 Ashton Valve Co. Boston.
 Lunkenheimer Co. Cincinnati.

WINDLASSES.

American Ship Windlass Co. Providence, R. I.
 American Ship Building Co. Cleveland.
 Hyde Windlass Co. Bath, Me.
 Jenks Ship Building Co. Port Huron, Mich.
 Marine Mfg. & Supply Co. New York.

WINCHES.

American Ship Windlass Co. Providence, R. I.
 Georgian Bay Engineering Works. Midland, Ont.
 Hyde Windlass Co. Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc. Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. Kingston, Ont.
 Great Lakes Towing Co. Cleveland.
 Midland Towing & Wrecking Co., Ltd. Midland, Ont.
 Parker Bros. Co., Ltd. Detroit.

YACHT AND BOAT BUILDERS.

Bertram Engine Works Co., Ltd. Toronto, Can.
 Drein, Thos. & Son. Wilmington, Del.
 Georgian Bay Engineering Works. Midland, Ont.
 Truscott Boat Mfg. Co. St. Joseph, Mich.
 Willard, Chas. P. & Co. Chicago.

YAWLS.

Drein, Thos. & Son. Wilmington, Del.

ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW.

The star (*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on pages noted.
 The dagger (†) indicates that advertisement appears once a month.

*Allen, John F. 3	Elphicke, C. W. & Co. 48	Lake Superior Contracting & Dredging Co. 54	Record of American & Foreign Shipping 44
Amey Water Tube Boiler Co. 43	Elwell, Jas. W. & Co. 48	Lebanon Chain Works 46	Red Star Line 30
American Bureau of Shipping 44	Erie & Western Trans. Co. 38	LeMois Scientifique et Industriel 4	Reliance Mfg. Co. 40
American Injector Co. 4		Lester, S. S. 48	Rice, Henry 49
American Line 39		Lockwood Mfg. Co. 41	*Richardson, W. C. 48
American Ship Building Co. 11	Falls Hollow Staybolt Co. 47	Lovejoy, H. O. 49	*Roberts Water-Tube Boiler Co. 3
American Ship Windlass Co. 2	Faust, Wm. H. 48	L. S. & M. S. Ry. 55	Roecker, H. B. 41
American Steam Gauge Co. 35	Ferdinand & Co., L. W. 4	Lunkenheimer Co. 46	Ross Valve Co. 46
Anchor Line 39	Fields, Capt. J. M. 49		Russell & Watson 45
Armstrong Cork Co. 58	Fisher Electrical Works 40	McCarthy, T. R. 48	
Ashton Valve Co. 35	Fitz-Simons & Connell Co. 54	McCurdy, Geo. L. 44	Sadler, Perkins & Field 49
Atlantic Works 41	Fix's, S. Sons 46	*McNab & Harlin Mfg. Co. 56	Safety Car Heating & Lighting Co. 8
*Atlantic Works, Inc. 6	Fleming & Co., P. H. 48	Macbeth Iron Co. 49	Scherzer Rolling Lift Bridge Co. 3-45
	Fletcher, W. & A. Co. 41	MacDonald, Ray G. 49	Schradner's Sons, A. 2
Balcock & Wilcox Co. 8	Fogg, M. W. 2	Manitowoc Dry Dock Co. 41	Shaw, Warren, Cady & Oakes 49
Baldt Anchor Co. 55	Fore River Ship & Engine Co. 41	Manitou Steamship Co. 38	*Shelby Steel Tube Co. 48
Baker Howard H. & Co. 56	Forest City Boiler Co. 46	Marine Iron Co., Bay City, Mich. 47	Sheriffs Mfg. Co. 45
*Bertram Engine Works Co., Ltd. 41	Forest City Paint & Varnish Co. 42	Marine Iron Co., Duluth 41	Shipowners' Dry Dock Co. 41
Bake, Geo. F. Mfg. Co. 45	Frankfort M. A. & P. G. I. Co. 44	*Marine Mfg. & Supply Co. 40	Shipping World 3
Boland, J. J. 48		Martin-Barriss Co. 43	*Smith & Son, Abram 47
Bremer & Co., Wm. T. 35	General Electric Co. 56	Matteson & Drake 40-49	Smith Co., L. P. & J. A. 54
Boston & Lockport Block Co. 35	*Georgian Bay Engineering Wks. 41	Mexican-American S. S. Co. 38	Smith Coal & Dock Co., Stanley B. 9
Boston Steamship Co. 39	Gilchrist, Albert J. 48	Midland Towing & Wrecking Co., Ltd. 55	Smith, Stanley B. & Co. 9
Bowers, L. M. & Co. 35	Gilchrist & Co., C. P. 48	Mietz, Aug. 6	Smooth-On Mfg. Co. 37
Brown Hoisting Machinery Co., Inc. 2	Gogebic Steam Boiler Works 41	Milwaukee Dry Dock Co. 10	*Standard Gauge Mfg. Co. 55
Buffalo Dredging Co. 54	Goodrich Trans. Co. 38	Mitchell & Co. 48	*Standard Oil Co. 55
Buffalo Dry Dock Co. 10	Gould, Holding & Masten 48	Morse & Son, A. J. 46	Starke Dredge & Dock Co., C. H. 54
	Great Lakes Engineering Works 12	Mosher Water-Tube Boiler Co. 43	Stark, Adam 49
	Great Lakes Register 52	Moulton Steering Engine Co. 42	Stirling Co. 8
	*Great Lakes Towing Co. 11	Mullins, W. H. 45	Stratford Oakum Co., Geo. 45
*Hamden Anchor-Rockland Machine Co. 13	Hall & Root 46		Sturtevant, B. F., Co. 58
Chase Machine Co. 6	Hanna, M. A. & Co. 47	Nacey, James 49	Sullivan, M. 55
Chicago & Gr. L. Dredge & Dock Co. 54	Hawgood & Co., W. A. 48	Newport News Ship Building & Dry Dock Co. 7	Sullivan & Co. 48
Chicago Ship Building Co. 10	Helm & Co., D. T. 48	New Jersey Zinc Co. 6	Superior Ship Building Co. 10
Cleveland City Forge & Iron Co. 47	Hickler Bros. 54	New York Belting & Packing Co. 4	
Cleveland & Buffalo Transit Co. 38	Holmes, Samuel 54	New York & Cuba Mail S. S. Co. 39	Taylor Water-Tube Boiler Co. 43
Continental Iron Works 2	Holzappel's American Compositions Co. 45	Niagara, St. C. & T. Ry. & N. Co. 38	*Temple Pump Co. 45
*Contractors' Supply & Equipment Co. 9	Hoyt, Dustin & Kelley 48	Northern Mich. Trans. Co. 38	Thropp, J. E., & Sons Co. 46
Cory, Chas. & Son 46	Hunt, Robert W., & Co. 48	Northwestern Steam Boiler & Mfg. Co. 42	Trout, H. G. 45
*Cruz Ship Building Co. 11	Hutchinson & Co. 48		Truscott Boat Mfg. Co. 40
Croup, Wm. & Sons, S. & E. B. 41	Hyde Windlass Co. 56		
*Randall & Son, H. I. 3	Hynd, Alexander 49	Otis Steel Co. 3	Union Machine & Boiler Co. 47
Crane Co. 43-44		Parker Bros. Co. 48	United Fruit Co. 38
		Pawling & Harnischfeger 42	Upson-Walton Co. 58
D & C. Line 38	International Mercantile Marine Co. 39	Peck, Chas. E. & W. F. 44	
Dake Engine Co. 42	Ironville Dock & Coal Co. 47	*Penberthy Injector Co. 8	Victor Metals Co. 2
Dearborn Drug & Chemical Wks. 9	Jenkins Brothers 56	Phosphor Bronze Smelting Co., Ltd. 40	
DeGrauw, Aymar & Co. 47	Jenks Ship Building Co. 11	Pickands, Mather & Co. 47	Walker, Thomas, & Son 43
Delaney, Belleville & Co. 25		Pittsburg Coal Co. 9	Ward Line 39
Delaware River Iron S. B. & E. Works 41	Kahnweiler's Sons, David 40	Pittsburg Testing Laboratory, Ltd. 49	*Watson-Stillman Co. 55
Detroit Ship Building Co. 11	Katzenstein, L. & Co. 40	Potter & Potter 49	Westinghouse Electric & Mfg. Co. 53
Detroit White Lead Works 2	Kidd, Joseph 49	Potter, J. D. 49	White, Johnson, McCaslin & Cannon 48
Duron Crane Co., Joseph 46	*Kieley & Mueller 35	Powell, Ambrose V. 49	*Willard, Chas. P. & Co. 35
Dunham Salvage & Wrecking Co. 44	Kingsford Foundry & Machine Works 42	Prindiville & Co. 48	Wood, W. J. 49
Drein, Thos. & Son 40	Kremer, C. E. 48		
Dunbar & Sullivan Dredging Co. 54			

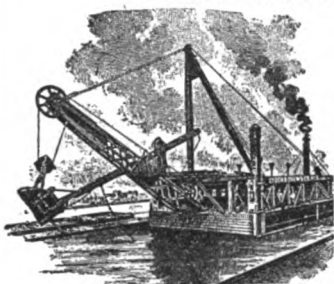
BUFFALO DREDGING CO.

GENERAL CONTRACTORS
ON
SUBMARINE WORK

Office D. S. GORMAN BLDG.

BUFFALO, N. Y.

CHICAGO & GREAT LAKES DREDGE AND DOCK CO.



OWNS AND OPERATES THE PLANTS
OF THE FORMER COMPANIES:

Lydon & Drews Co.,
Hausler & Lutz Co.,
Green's Dredging Co.,
Chicago Star Con. & D.
Co.,
McMahon & Montgomery
Co.,
Chicago Dredging & Dock
Co.,
Griffith, McDermott &
Watt Dredging Co.

Contractors for

RIVER AND HARBOR IMPROVEMENTS.

Main Office: 1319-1322 Chamber of Commerce - CHICAGO.

Dunbar & Sullivan Dredging Co., of Buffalo, N. Y.

Will contract to remove ROCK or EARTH on the Great Lakes to 40 ft. depth.
To remove ROCK on Atlantic Coast to 40 ft. depth.

THAT'S ALL.

We SOMETIMES rent plant to responsible parties at OUR terms.

Dredges.

Brian Boru, Steel.
Tipperary Boy, Steel.

Erin Go Braugh.

Drill Boats.

Geo. A. Howells and

another, both Steel.

Tugs.

Shaughraun, Steel.

Phil Sheridan, Steel.

Spalpeen, Steel.

Paddy Miles, Steel.

Shaun Rhue, Steel.

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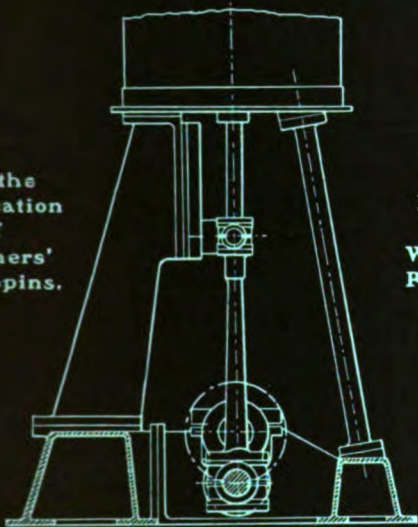
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Eastward	Arrive from West	Depart East
No. 18, Southwestern Limited		*1:50 a.m.
No. 22, Lake Shore Limited	*2:12 a.m.	*2:20 a.m.
No. 20, Chicago and Cleveland Exp.	*7:20 a.m.	
No. 28, New York and Boston Exp.	*7:40 a.m.	*8:00 a.m.
No. 40, Toledo and Buffalo Accom.	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail	*11:25 a.m.	*11:30 a.m.
No. 48, Accommodation via Sandusky	†1:40 p.m.	
No. 42, Boston-New York Express		*11:45 a.m.
No. 44, Cleveland and New York Spl.		*3:00 p.m.
No. 46, Southwestern Express		*3:10 p.m.
No. 116, Ashtabula Accommodation		†4:30 p.m.
No. 6, Limited Fast Mail	*5:40 p.m.	*5:45 p.m.
No. 26, 20th Century Limited	*7:40 p.m.	*7:43 p.m.
No. 10, Chicago, N.Y. & Boston Spl.	*7:30 p.m.	*7:50 p.m.
No. 16, New England Express	*10:30 p.m.	*10:35 p.m.
No. 2, Day Express	†9:10 p.m.	†9:25 p.m.
No. 126, Norwalk Accommodation	†7:55 a.m.	
Westward	Arrive from East	Depart West
No. 7, Exposition Limited	*12:50 a.m.	
No. 11, Southwestern Limited	*2:55 a.m.	
No. 9, Day Express		†6:10 a.m.
No. 15, Boston and Chicago Special	*3:10 a.m.	*3:15 a.m.
No. 19, Lake Shore Limited	*7:15 a.m.	*7:25 a.m.
No. 23, Western Express	*10:30 a.m.	*10:35 a.m.
No. 29, Southwestern Special	†11:10 a.m.	
No. 33, Southwestern Express	*12:25 p.m.	
No. 133, Cleve'and and Detroit Exp.		*12:45 p.m.
No. 47, Accommodation	†11:00 a.m.	†3:00 p.m.
No. 141, Sandusky Accommodation		†3:10 p.m.
No. 43, Fast Mail	*4:35 p.m.	*4:40 p.m.
No. 127, Norwalk Accommodation		†5:10 p.m.
No. 37, Pacific Express	*6:50 p.m.	*7:20 p.m.
No. 3, Fast Mail Limited	*10:50 p.m.	*10:55 p.m.
No. 115, Ashtabula Accommodation	*8:30 a.m.	

*Daily. †Except Sunday. ‡Except Monday.
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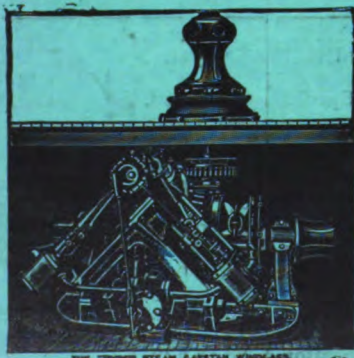
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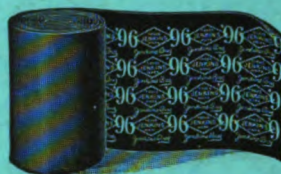
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